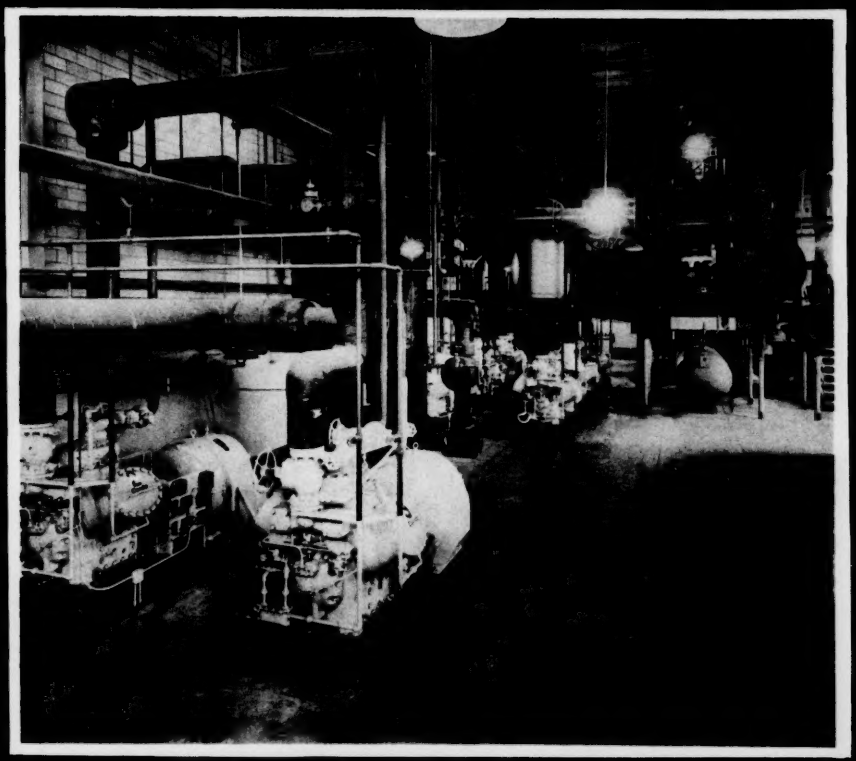
ICE and REFRIGERATION



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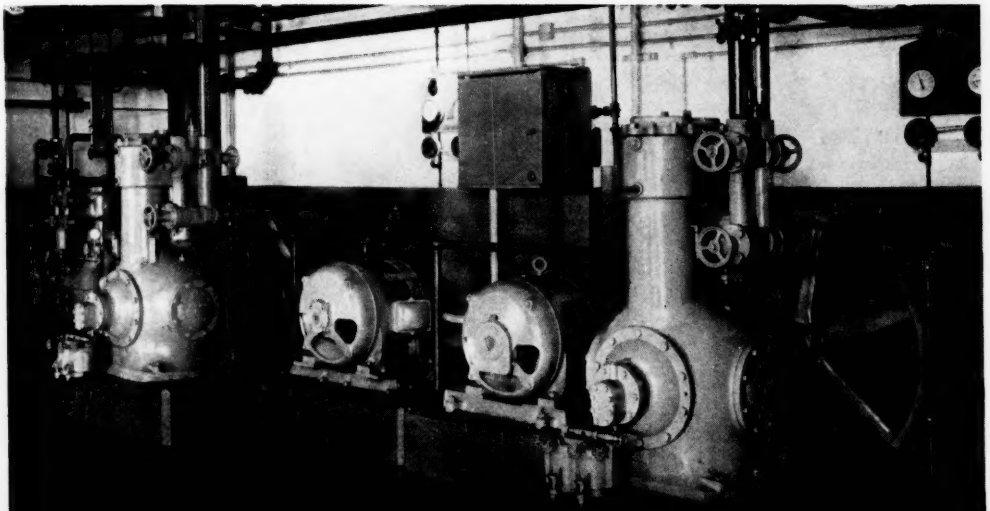

NO WAX IN SYSTEMS . . .

. . . when compressors are lubricated with TEXACO CAPELLA OIL (*Waxfree*)

Whether you're refrigerating in the normal range or down to minus 100° F., you won't get any wax precipitation with *Texaco Capella Oil (Waxfree)*. Regardless of the type or size of compressor, or the refrigerant used, *Texaco Capella Oil (Waxfree)* assures clean efficient compressor operation.

Texaco Capella Oil (Waxfree) has outstandingly low haze and floc temperatures . . . outstanding resistance to oxidation and freedom from moisture. It does not react with refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* – new and improved to give you better performance. You can get them in *refinery-sealed* 55-gallon drums, and 5-gallon, 1- gallon and 1-quart containers.

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The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Capella Oils (Waxfree)
FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

Faithfully yours 50 *for Fifty Years*

TUNE IN: On television—the TEXACO STAR THEATER starring MILTON BERLE. See newspaper for time and station.

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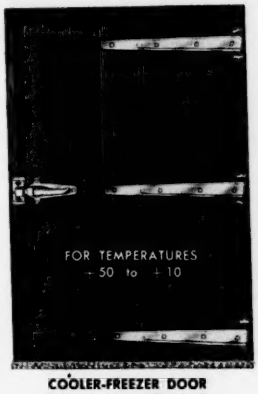
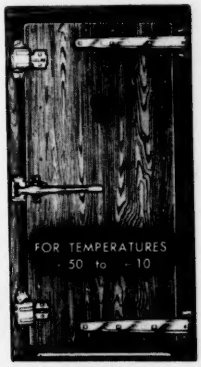
MOST DURABLE
ONLY 100% MODERN

REFRIGERATOR DOORS BUILT IN THE WORLD

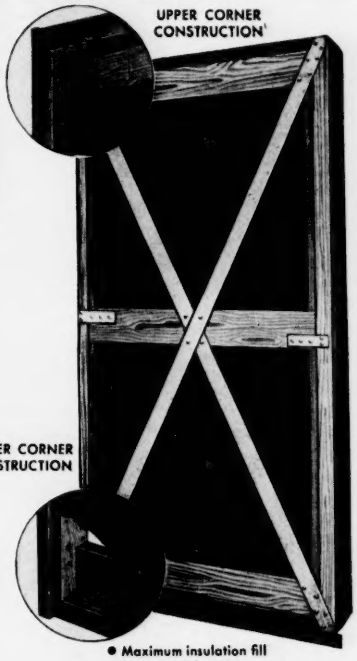
NEW "X-TYPE" DOORS
FEATURING "X-TYPE" STEEL DIAGONAL BRACING



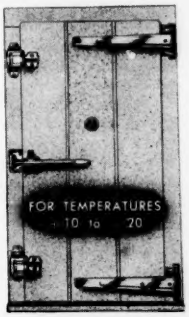
COOLER-FREEZER DOOR
- Modern streamlined job
- 100% "Douglas Fir"
- Sanitary hardware



X-52 PLYWOOD PANEL DOOR
- Plywood front and back
- Extra heavy-duty hardware
- Special type gaskets

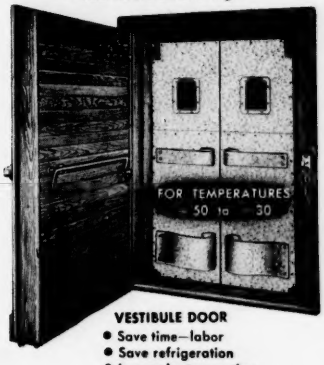


- Maximum insulation fill
- Most possible rigidity
- Allows reversal of swing



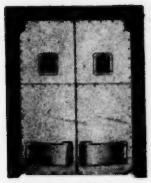
LOW TEMPERATURE DOOR
- Entire metal-clad front
- Extra heavy-duty hardware
- Special type gaskets

SUPER FREEZER (OVER-LAP) DOOR
- Extra-heavy construction
- Extra-heavy duty gaskets
- Extra heavy-duty hardware

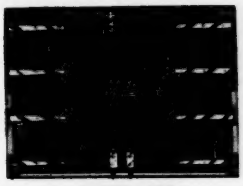


VESTIBULE DOOR
- Save time—labor
- Save refrigeration
- Large plant operation

TRACK DOOR
- For abattoirs
- Meat handling rails
- Banana rooms



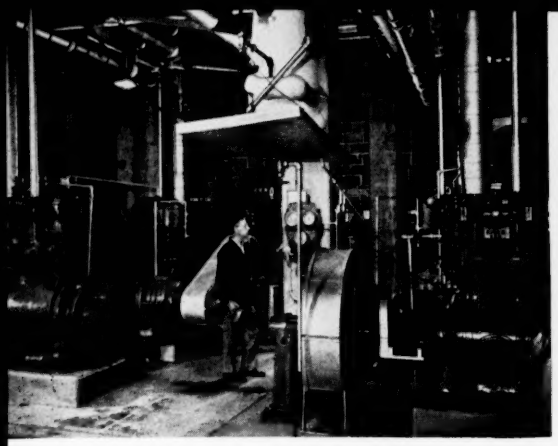
AUTO-CLOSE DOOR
- For loading dock
- Intra-cooler doors
- Heavy trucking



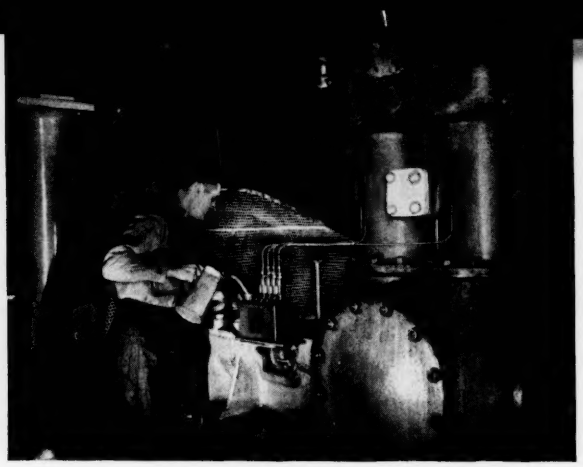
DOUBLE DOOR
- For palletizing
- For carloading
- For elevator shafts

When a Man Thinks Twice ... He Makes Comparisons!

BUTCHER BOY REFRIGERATOR DOOR CO. • 170 N. SANGAMON ST., CHICAGO 7, ILL.



COMPRESSOR EFFICIENCY UP 15%. Six years ago, these Frick compressors were losing efficiency because the oil formed excessive lacquer and carbon deposits. Clogged lines made frequent overhauls necessary. The company changed to Suniso Refrigeration Oil and its natural detergency immediately began attacking the deposits throughout the system. The carbon and lacquer deposits were rapidly carried away to traps and filters, and the system was soon entirely cleaned. Since then compressor efficiency has increased 15%.



SLUDGE AND WAX ELIMINATED. A firm engaged in constructing and servicing industrial refrigeration equipment had constant trouble with compressor oils. Every oil tried lost viscosity excessively under high operating temperatures, vaporized and formed sludge, or formed wax at low temperatures. Complaints were numerous and time lost on call-backs was costly. After consulting compressor manufacturers, the company switched to Suniso. This product immediately solved all sludge, wax and low temperature problems.

SUNISO HELPS INCREASE EFFICIENCY OF 3 REFRIGERATION SYSTEMS

Here are typical examples of how Suniso Refrigeration Oils are helping increase compressor efficiency and are keeping refrigeration system maintenance to a minimum. Following the lead of original equipment manufacturers, more and more maintenance men and refrigeration engineers are safeguarding the efficiency and reliability of their compressors with Suniso.

Suniso Refrigeration Oils meet the requirements of *all* compressors and *all* refrigerants. To get more information, just fill in and mail the coupon below.

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Philadelphia 3, Pa.

☐ Please send me a copy of the illustrated booklet "Suniso Refrigeration Oils."

☐ Please send me a copy of the technical bulletin "Lubrication of Refrigeration and Air Conditioning Equipment."

☐ Please have a Sun representative contact me.

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Title_____

Company_____

Address_____

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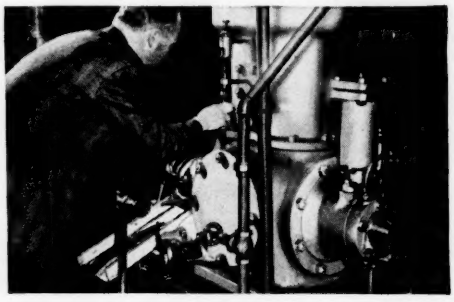

SEPARATION TROUBLE ENDED. In this 15-ton ammonia compressor, the oil discolored badly and failed to separate properly from the refrigerant. Excessive amounts of oil carried over into the separators, lowering the efficiency of the entire system. With a switch to Suniso, separation, carryover and discoloration problems ended.

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October, 1952

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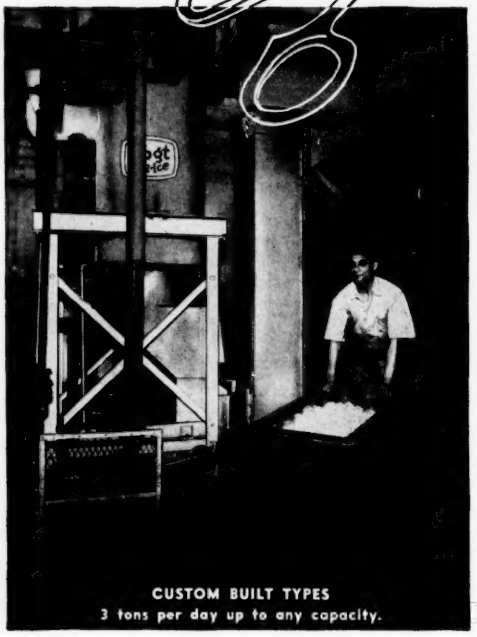
SAVES POWER: The Tube-Ice process utilizes direct application of the refrigerant to the ice freezing surfaces thereby eliminating all power costs incidental to brine systems.

SAVES LABOR: Being wholly automatic in operation and discharging ice in its ultimate sized form, the self-contained Tube-Ice Machine unit requires no labor and only a minimum of supervision.



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3 tons per day up to any capacity.

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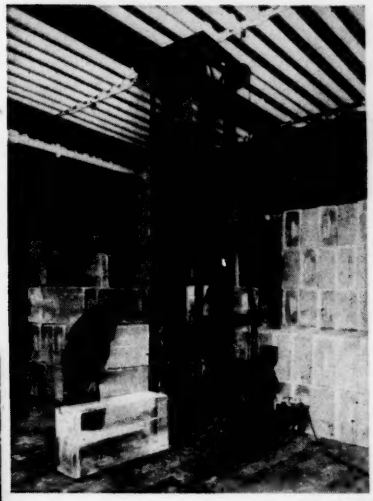
TYPE "LA"

An electrically operated (3 hp) automatic tiering machine for 300- and 400-lb. ice. Solenoid type holding brake and cut spur gears to drum shaft, speed 113 fpm, stack to 10 tiers. Complete with visual tier-finder, push-button control, plug and receptacle.



TYPE "N"

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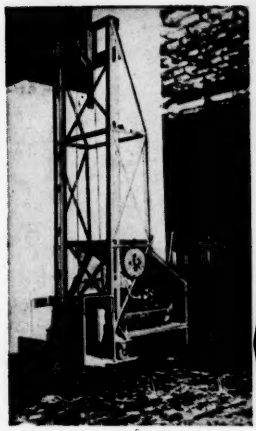

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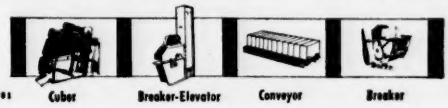
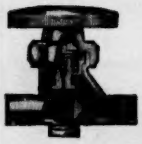


Cuber Breaker-Elevator Conveyor Breaker



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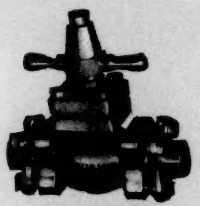

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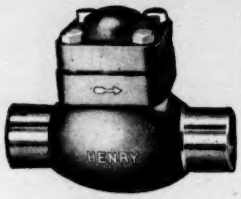
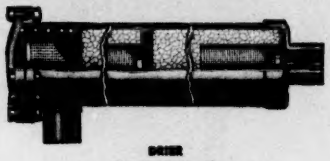
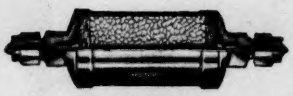


CHECK VALVE
Piston Type For Freon. Sizes ⅜" through 4⅛" O.D.S.



DRIER
Cartridge type with dispersion tube



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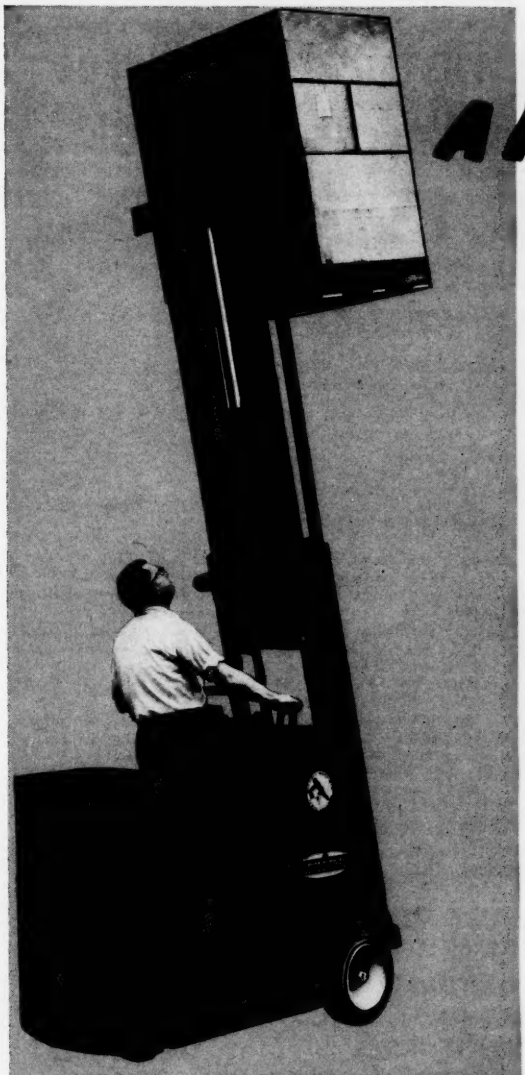

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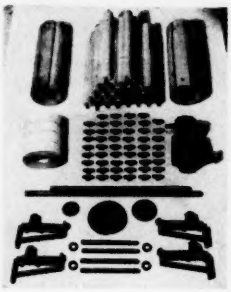

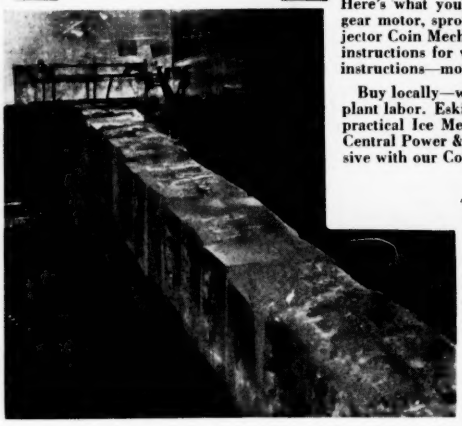

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We can supply S & S units for you anywhere. Write us for prices and description for complete stations or for vault installations.

"TAKE A PICK" VENDORS

No automatic ice vending operation is complete without a "TAKE-A-PICK" Vendor to give them complete service. At the same time, cut your advertising cost by selling picks instead of giving them away.

"The Eskimos will be at the NATIONAL ICE ASSN. CONVENTION NOV. 11-14, 1952 CINCINNATI

If you haven't bought a station because you cannot get the storage capacity desired, let us design a station for your individual requirements.

BALLARD SALES COMPANY

P. O. BOX 1121 — FORT WORTH, TEXAS

In the Spotlight

A NEW REFRIGERATOR car, with refrigerating equipment suspended beneath the body of the car is now being tested by the Canadian National Railways. A test run has been made with satisfactory results. For description and pictures, see page 11.

A NEW COLD STORAGE plant with advanced engineering ideas has been established in Hopkins, Minn., by the Merchants Refrigerating Company, New York City. A description, with pictures, of these engineering features is published in the article starting on page 13.

BETTER BUSINESS planning is a Must today, particularly if a satisfactory profit is to be earned during these trying times. An accounting device — the break-even point — is offered as a means of keeping the manager of a business informed at all times as to the relation of business costs and profits. This is discussed in article on page 17.

COLD STORAGE Holdings, including both coolers and freezers, were about equal to occupancy levels reported last month, with 63 and 78 per cent respectively. Details are given in article on page 19.

INCREASED INTEREST is being shown in the refrigerated storage of candy, according to report of a survey conducted at the Georgia Experiment Station. Results and conclusions from this survey are published in the article on page 23.

FROZEN FOOD wholesalers find certain well defined advantages in the service provided by public refrigerated warehouses. These advantages, as well as possible pitfalls in private warehouses, are enumerated and discussed in the article starting on page 26.

COVER: General view of engine room of Merchants Refrigerating plant, Hopkins, Minn., showing, left to right, two of the three high stage compressors, the six low stage compressors, two brine coolers with liquid receiver below, liquid transfer receiver, and edge of electrical panel board. See story on page 13.

A SHRIMP TRAWLER takes on anywhere from eight to thirty tons of crushed ice, depending upon the size of the boat, every time it makes a trip into the Gulf during the summer months.

A PANEL of industry leaders who have met today's biggest business problems will offer the benefit of their experience to ice men at the annual convention of the National Association of Ice Industries. See page 31.

ICED CORN is paying off in Ohio where the Agricultural Station at Ohio State University has done much to sell the idea to the public. A picture story of the harvesting and packing process is on page 33.

A PREVIEW of the annual convention of the National Association of Practical Refrigerating Engineers, to be held at Dallas, Texas, November 12-14 is given in the article on page 39.

N & C Employees Honored Join Twenty-Five Year Club

TWO employees of Nickerson & Collins Company, publishers of ICE AND REFRIGERATION were honored September 11 by presentation of a beautiful watch and a government bond apiece. The occasion was their recent completion of twenty-five years consecutive service with the company. Those honored were Mrs. Helen G. Smith, assistant manager, and Edgar R. Curry, managing editor. The presentations were made by H. T. McDermott, editor and publisher and R. L. Townsley, secretary-treasurer.

60 Years Ago

From the October, 1892 issue of ICE AND REFRIGERATION

THE MONTH of September was not a very good one for the ice trade, the weather generally having been cool, especially in the west. The stocks of ice, however, were beginning to run low in all parts of the country.

THE NEW NATION a "liberal" magazine is quoted as saying that the current hot weather was a good time to boom the idea of city or town ice houses to be run at cost by every municipality which has a public water supply and reservoir. "Ice during the summer weather is regarded as almost as great a necessity as water, and it is nonsense for a municipality which supplies the people with water from a public reservoir not to supply them likewise with ice from the same reservoir." While this scheme indicates some practical aspects, it is based on entirely different principles from those pertaining to the supply of water and other necessities.

RIPE FRUIT shipments from California to London overland in refrigerator cars to New York and thence in refrigerated holds of the White Star Liners Majestic and Teutonic had been only partially successful. The fruit has been landed in England in apparently good condition and it brought fairly good prices but it did not seem to "stand up" as it should. The difficulty appeared to be its accellerated deterioration after being removed from refrigeration.

THE REFRIGERATOR CAR, having been largely instrumental in developing fruit growing in California, is giving an impetus to the same industry in Georgia, where attention has more largely been given to vegetables. Considerable quantities of Georgia peaches have reached Chicago and other northern markets this season.

FREEZING WORKS in the interior grazing districts of Australia are being promoted in order to do away with the present practice of driving beeves and sheep on the hoof for slaughtering at the freezing works on the coast, whence the carcasses are shipped to England and the continent. This is in line with the American practice where the great packing houses are gradually but surely gravitating nearer to the grazing lands.

"We take no chances with dirt. We insist on Packaged Processed Ice"

SAYS LESTER J. QUINN, FAIRFAX AIRPORT RESTAURANT, KANSAS CITY, KAN.

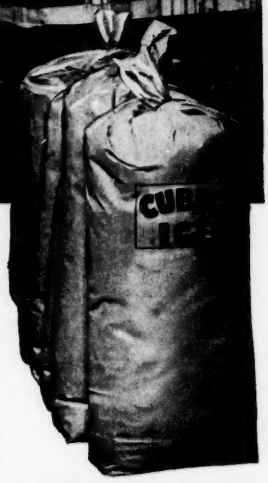
The Fairfax Airport Restaurant occupies one wing of the beautiful airport building of Kansas City's Municipal Airport.

Don't Let Another Month Pass Without Using One-Trip Ice Bags

"Formerly, we had ice delivered in bushel baskets, but it was too often dirty when we received it," reports Mr. Quinn. "Now we insist on Union Paper Ice Bags. Our ice is clean and the bags retard melting so satisfactorily that ice delivered on Saturday will carry over for Sunday."

Union Paper Ice Bags help your own operation, too. Your service is faster because handling time on the platform, in loading and at delivery point is cut down. Customers do their own icing and use more ice.

Yes, the companies using Union Paper Ice Bags get the cream of the business according to reports clear across the country. If you haven't already asked for samples of the one-trip Union Paper Ice Bag, don't delay. Write for free samples now.



Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet... thanks to a water repellent resin that binds the fibres of the paper firmly together.

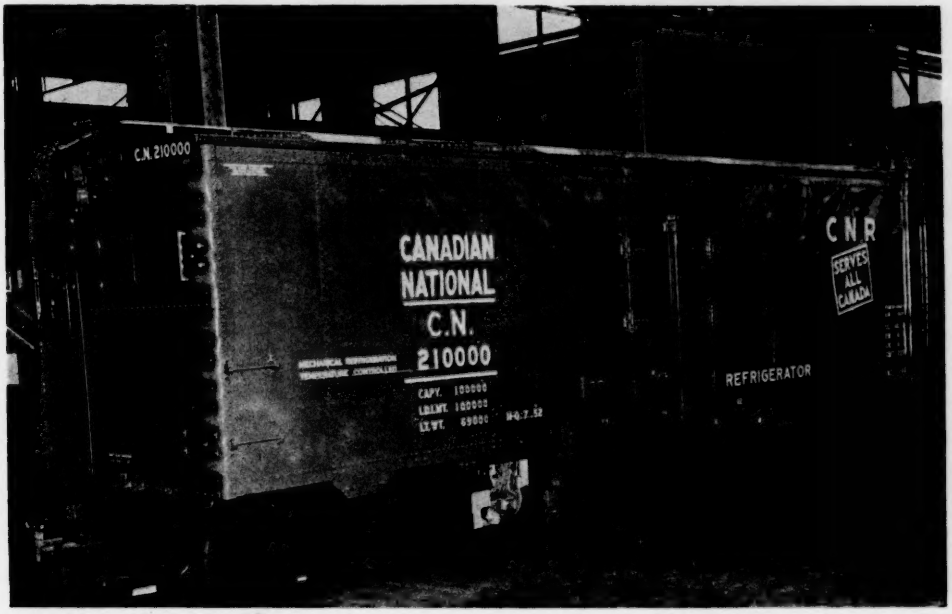
ONE TRIP

UNION Paper Ice Bags

A product of the UNION BAG & PAPER CORPORATION • 233 Broadway, New York 7, N.Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine, Laminates

New Refrigerator Car Carries Refrigeration Unit Underneath Body



The first mechanical refrigerator car built with refrigerator equipment suspended beneath the body stands in the C. N. R.'s Point St. Charles shops in Montreal. Running tests on the new car are now underway. (Photo Canadian National Railways)

THE Canadian National Railways is experimenting with a new rolling refrigerator, the first of its kind on the continent. Unlike the mechanical refrigerator cars now in operation on United States railroads, the C.N.R.'s experimental model does not have its refrigeration equipment housed in the body of the car at one end. To preserve full cargo capacity this equipment, including a 34-hp diesel engine driving the electric generator which operates the refrigeration unit, is suspended beneath the body.

The only exception to this innovation is that two evaporators, which circulate cool air throughout the car, are placed between the ceiling and the roof of the 'reefer'.

Mechanical refrigeration utilizes the latent heat of vaporization which varies with different liquids. In the new CN 210000, the liquid refrigerant —Freon 12—is first allowed to boil in the space to be cooled. Picking up the heat inside the car, the refrigerant vapor is passed through a condensing unit where it is condensed back to liquid, releasing its heat.

Temperature at which the refrigerant boils is adjustable, with the result that any desired temperature can be maintained, with only slight variation, by thermostatic control.

Inside the new car, currently undergoing test runs along C.N.R. lines in Canada, the refrigerant is boiled in the two evaporators, each having a surface area of 334 square feet. Two blower fans, driven by three-quarter horsepower motors and attached to the evaporators, constantly pass car air through the evaporators where the refrigerant absorbs the heat.

Heat Dissipated Outside

Heat, taken out of the freight space in this manner, is dissipated outside by a condensing unit. This unit, comprising of a seven-and-a-half horsepower compressor, serves two purposes:

1. Removes the refrigerant vapor from the evaporator.
2. Passes the refrigerant vapor to the condenser where, raising the vapor's pressure and temperature to a point where outside air can absorb heat of vaporization, condenses the refrigerant back to liquid.

On the heat transfer surface of the condenser is finned tubing through which outside air is circulated by a fan to increase heat transfer capacity. When the refrigerant vapor is condensed, it is passed into a liquid receiver of 35 pounds capacity.

From the receiver, the condensed liquid is passed through copper tubing to thermostatic expansion valves which control the flow of refrigerant into the evaporators. They are adjusted to feed sufficient refrigerant into the evaporators to utilize the total evaporator surface without allowing any liquid refrigerant to pass on to the compressor. Liquid refrigerant on that part of the circuit would not help the cooling process.

Service tests on the first rolling refrigerator car, built with refrigeration equipment suspended beneath the body, are being held by the C.N.R. this summer. The tests are under the supervision of J. L. Townshend, general supervisor of perishable traffic, (left), who with W. J. Hart, chief car draughtsman, examines the diesel unit swung out to facilitate servicing.

Thermostatic Switch Controls Temperature

Car temperature is thermostatically controlled by a switch operated by gas-charged bellows connected to a bulb located in the evaporators' air stream. Temperature changes in the bulb give rise to corresponding pressure changes on the bellows. These then actuate micro-switches in series with the compressor motor starting relay to stop or start the refrigeration equipment as cooling requirements demand.

Another installation also prevents weather changes outside from affecting temperatures inside the car. Electric heater elements in the evaporator blower system may add heat in case it becomes colder outside.

Defrosting

The heater elements are also used to defrost the evaporator at regular 12-hour intervals. All controls are completely automatic. They only require manual adjustment prior to a trip to maintain the temperature desired for the particular product carried.

To prevent frost damage to shipments of fresh foods, the outlet air temperature from the evaporator is not allowed to go below a given level. An evaporator pressure regulating valve in the suction line does this trick.

Protective devices have also been installed to prevent serious equipment damage in case of operating irregularities.

The diesel engine can be automatically stopped if excessively low fuel or lubricating oil pressures occur and if engine speed or water temperature becomes too high.

Refrigerating Unit

The refrigerating unit itself is protected by a high-pressure cut-out in case of too high head pressure. An overload protective device is also located in the electric power circuit which opens the circuit and stops the unit in case of a continued overload on the motor. All motors are further protected by cartridge-type fuses in the power supply panel.

A false ceiling is installed in the car to facilitate air circulation. Situated above the ceiling, the blowers extract air from one side of the car and force it, cooled, into the other half. Vertical ducts are laid at close intervals on the walls. Thus air is circulated down ducts on one side, under floor racks, and up similar ducts on the other side.

The diesel engine, operating continually on trips, drives a 220-volt, 20 kilowatt, three phase, 60-cycle generator.

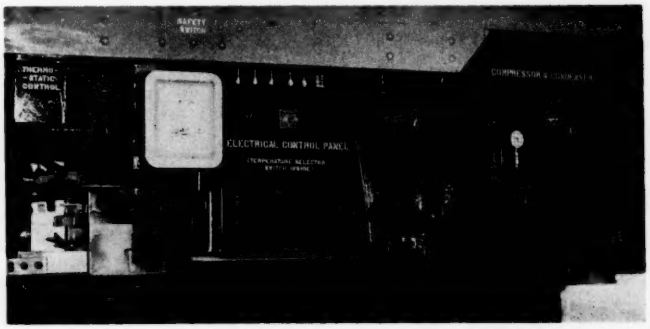
Test Run

First test run of the new rolling refrigerator was from Toronto to Truro, N. S. with packinghouse products. A return trip was made from Halifax with frozen fish. In late August, the car is scheduled to roll out of Prince Rupert, B. C., with another load of frozen fish for eastern markets. Later in the year, freshly-harvested fruit is slated to be carried from the Niagara district to either an eastern or western market.

Results of tests up to now have not yet been tabulated by the research and development department of the C.N.R.

New Malaya Ice Plant

A COMPLETE five-ton ice plant has been supplied to the Kelanthan ice works at Kota Bharu, Malaya by Worthington. It consists of an 8 x 8 vertical ammonia compressor, a 30-in Spira-Flo condenser, a surge drum, and an oil separator. The plant was designed by Worthington's engineering department.



Part of the refrigeration unit on the new C.N.R. mechanical refrigerator car is shown above. Included are the electrical control panel containing the temperature selector switch, the thermostatic control designed to maintain the temperature selected, the compressor and the condenser.

New Cold Storage Plant Incorporates Advanced Engineering Ideas

Merchants Refrigerating Co., Hopkins, Minn. plant is designed to provide for additional capacity when required. Present systems handles 170 ton brine cooling load for four freezer rooms and 70 ton blast freezer load

A. W. HEINTZ
Carrier Corporation

WHEN Merchants Refrigerating Company of New York City was considering the purchase of refrigerating equipment for its new cold storage warehouse in Hopkins, Minnesota, (see ICE AND REFRIGERATION, April 1952, Page 49) there were a number of specific conditions and objectives to be met. Among the most interesting were:

1. To provide 170 tons of brine cooling refrigeration at minus 30 F evaporating temperature, for freezer storage rooms in a two-stage system.
2. To provide 70 tons of blast freezing refrigeration at minus 40 F evaporating temperature in a two-stage system now, with 70 tons to be added at a later date.
3. To provide spare compressors for low stage and high stage service, making them interchangeable between each stage.
4. To arrange for overhead installation of coils and fans in the batch type blast freezer so entire floor area below them is available for stacking the product to be frozen and to allow for defrosting of the coils.
5. To arrange for equipment failure tie-in with ADT Co. alarm system since the plant will be unattended for up to 16 hours per day.

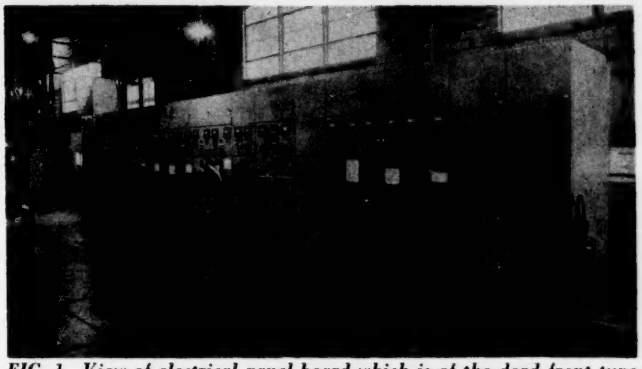


FIG. 1—View of electrical panel board which is of the dead front type and has blank panels for future equipment additions. The extra cubicle above the pressure gauges at the left end of the board contains the ADT equipment failure indicating lights.

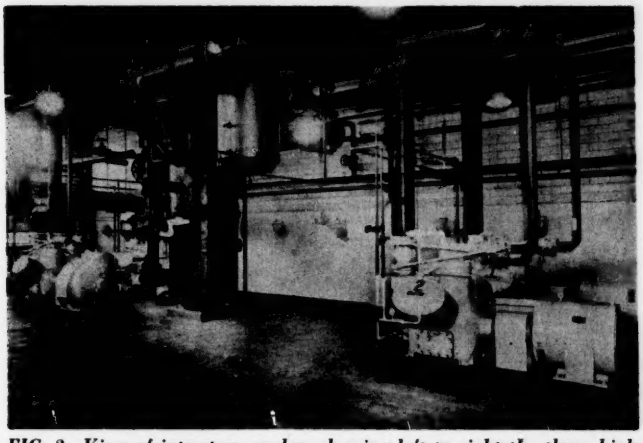


FIG. 2—View of interstage coolers showing left to right the three high stage compressors, refrigerant cooled intercooler, low stage discharge oil separator with water cooled intercooler at wall in back and two of the six low stage compressors.

Items 1 and 2 were combined in selecting equipment to provide the refrigeration tonnage in the two-stage system. Separate suction mains for brine cooling and blast freezing are provided, the latter sized for future blast freezer additions and both having valved outlets for addition of two or more compressors in the future. Six Carrier 5J63-7 in. bore, low-stage compressors direct driven by 60 hp, 720 rpm synchronous motors and three Carrier 5J61-6¾ in. bore, high-stage compressors direct driven by 200 hp, 720 rpm synchronous motor were installed. Each of the 5J63 low stage compressors is valved so it can operate on either the brine cooling or blast freezing load. With a 35 psig intermediate pressure, each has a capacity of 51.5 tons at minus 30 F suction for brine cooling service. For blast freezing service at minus 40 F suction each has a capacity of 36.1 tons. Accordingly two of the six low stage compressors, having a total of 72.2 tons will adequately handle the blast freezing load of 70 tons. The other four, having a total capacity of 206, more than adequately handle the 170 ton brine cooling load.

All of these low stage compressors are equipped with automatic capacity

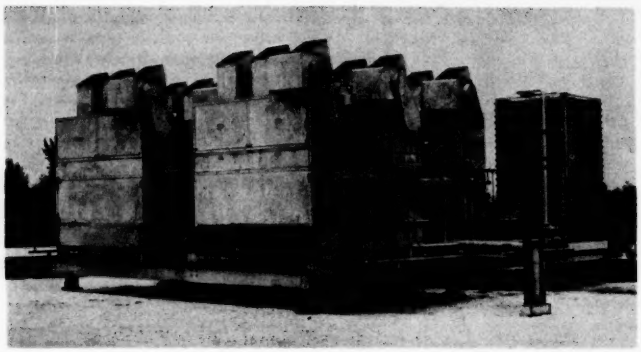


FIG. 3—View of evaporative condensers on the roof. The water cooling tower at the right handles the water for interstage cooling and for compressor head and oil cooling.

control actuated by low pressure cut-out switches so each can operate at ⅓, ⅔ or full load. Thus there are 12 steps of load variation for brine cooling and six steps for blast freezing, providing exceptional flexibility for seasonal operation.

The low stage compressors discharge to the high stage compressors through a single set of intercoolers. The discharge first goes through a large discharge oil separator, then through a shell and tube type water cooled gas desuperheater and finally through a shell and coil type refrigerant cooled combined gas desuperheater and liquid ammonia subcooler. All three of these vessels have three valve bypasses so they can be cut out of service if desired.

Spare Compressor

Normally, only two of the three 5J61 high stage compressors are required to handle the plant load so the third is a spare compressor. Valved outlets are provided in the high stage piping for a fourth compressor in the future. Each high stage compressor has a capacity of 140.1 tons at 35 pounds psig suction and 185 psig discharge pressures. The high stage load, including the intercooling load is approximately 260 tons, therefore, the 280.2 tons provided by the two compressors is more than adequate. These also have automatic capacity control. This control is set so that these high stage compressors float on the line, adjusting themselves to the low stage load, maintaining between 30 and 40 psig intermediate pressure.

Briefly, the high side of the system consists of six Carrier 9E11 evaporative condensers having a total of 300 tons capacity. They are located on the roof of the engine room with space allowed for future addition of two more condensers. A 48 in. diameter by 20 ft. long liquid receiver and automatic purge are located below the two brine coolers in the engine room. Due to the freezing temperatures experienced in this area, the evaporative condenser water spray recirculating pumps are located in the engine room so they can be cut in and out of service as the weather demands. For winter operation the fans of the evaporative condensers are automatically cut in and out of service upon change in discharge pressure.

When considering the spare compressor requirements of Item 3 the first thought would be to install two compressors, one for low stage and the other for high stage service. Actually only one spare compressor was installed, driven by a 200 hp motor. It is located at the high stage side of the system and is piped and valved to serve as a low stage or a high stage spare compressor. To obtain added flexibility of operation, one of the regular high stage compressors is also piped and valved in the same manner as the spare compressor. The cross-over piping and valving permits either compressor to take suction gas and discharge it as follows:

a. From the intercoolers to the condensers. (Regular high stage service).
b. From the brine coolers to the intercoolers (Regular low stage service.
c. From the blast freezers to the intercoolers (Regular low stage service).
d. From the brine coolers to the condensers (Pumpout and temperature pull-down service).
e. From the blast freezers to the condensers (Pumpout and temperature pull-down service).
f. From the liquid transfer receiver to the intercoolers.
g. From the liquid transfer receiver to the condensers.

Functions d and e are important because they permit operating the compressors single stage to pull down the brine or the blast freezer rooms

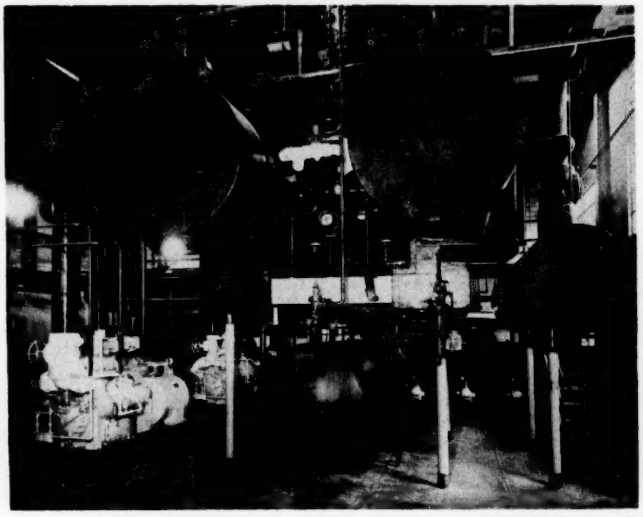


FIG. 4—View of the two brine coolers mounted on steel platform with liquid receiver below three of the six low stage compressors at left and liquid transfer receiver at right. Note evaporative condenser water collecting tank with three of the six spray water recirculating pumps in background between the receiver and stairway.

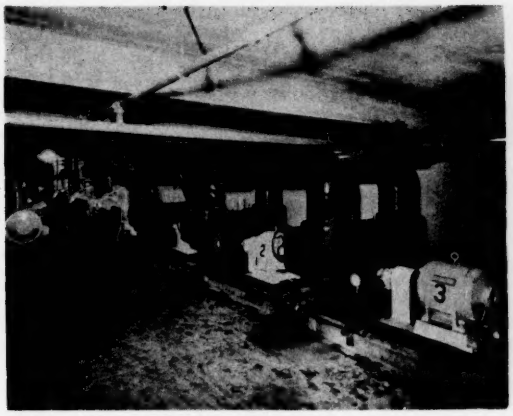


FIG. 5—View of the three 800 gpm brine pumps with low stage compressors at the left.

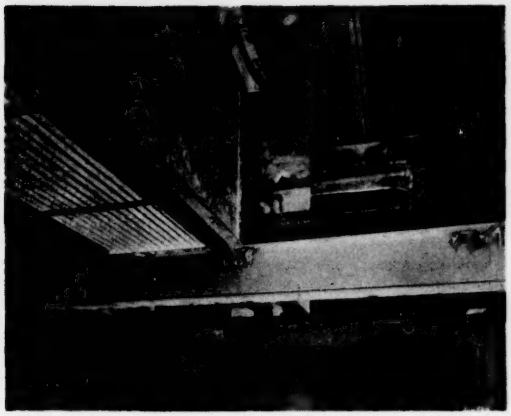


FIG. 6—Worm's eye view of blast freezer before false ceiling was installed. Coils of one of the four cold diffusers, mounted on supporting beams, can be seen at left. Note ductwork from fans of second cold diffuser, also the 12 in. wide air discharge slots at side wall between beams at right.

when these are at high temperature. Single stage operation was thus employed when the entire warehouse was brought down in temperature when initially placed in operation. Similarly, some blast freezing loads may have high product temperatures initially and the temperature can be brought down by single stage operation to the point where two-stage operation is necessary and desirable.

Item 4 required that the entire floor area of the blast freezers be made available for the products to be frozen. Cooling coils and fans, therefore, had to be installed in a mezzanine area above each blast freezer. This ing proper air distribution as well as presented the problem of securthat of disposing of water when the coils were defrosted.

The final layout resulted in the use of standard Carrier cold diffuser coils and casings with standard Carrier fan sections mounted above these coil casings. Each of the blast freezers has four of Carrier's largest size cold diffuser coil assemblies. They are mounted on a steel framework above the product freezing area in such a way that they are equidistant from side and end walls as well as from each other. The bottom of the coil casings are open to the product freezing area below them.

A corrugated steel, false ceiling is laid across the steel framework to cover the open spaces between the coil casings and the walls of the room, with an opening about 12 in. wide left between this false ceiling and each long side wall of the room. Air discharge transition pieces are provided from the fan outlets to these 12 in. wide openings. This provides a

OPERATION OF PROTECTIVE DEVICES IN EVENT OF MECHANICAL FAILURE

Control Instrument	Connected to	Actuated by	ADT Co. Alerted	Plant Shutdown	Remarks
High pressure cutout switch	Compressor discharge	Rise in discharge pressure	Yes	No	Shuts down controlled compressor
Oil pressure failure switch	Compressor oil piping	Drop in oil pressure	Yes	No	Shuts down controlled compressor
Direct current no-voltage relay	Direct current wiring	Inoperative exciter	Yes	Yes	
Float switch	Brine balance tank	Drop in brine level	Yes	Yes	
Brine thermostat	Brine cooler head	Drop in brine temp.	Yes	Yes	
Air thermostat	Blast freezer room	Rise in room temp.	Yes	No	Set at start of freezing pull-down
Low pressure cut-out switch	Brine cooler suction	Drop in suction press.	Yes	Yes	
Low pressure cut-out switch	Blast freezer suction	Drop in suction press.	Yes	No	
Float switch	Brine cooler surge drum	Rise in ammonia level	Yes	No	Also closes solenoid valve in liquid line to surge drum
Float switch	Blast freezer surge drum	Rise in ammonia level	Yes	No	Same as above
Float switch	Ammonia cooled intercooler	Rise in ammonia level	Yes	No	Same as above
Low pressure cut-out switch	Cooling tower pump	Inoperative pump motor	Yes	Yes	Pump supplies water to compressor heads and water cooled intercooler

NOTE: When plant shut-down takes place, a solenoid valve in main liquid supply line at receiver closes to prevent further liquid feed to plant.

means for directing the air discharge from the fans downward along each sidewall for its full length.

Products stored in the blast freezing rooms are kept 12 in. away from the side walls so the discharge air distributes evenly over the entire product area along the side walls. Fans then pull the air through the product into the bottom portion of the coil casings openings and then over the coil surface itself.

This arrangement has proved very effective. In a recent test, 71,000 pounds of packaged pork bellies were frozen to a temperature of minus 8 F in 17 hours, whereas expected capacity was 50,000 pounds of product in 24 hours.

Defrosting

Defrosting of the coils in the blast freezer rooms is accomplished by the use of hot gas. With the blast freezer coils open to the room at the false ceiling level, means had to be provided to dispose of the water. A water collecting pan has been built which is mounted on a buggy, this pan being roughly about two feet wider and two feet longer than the coil casing. This portable water collecting pan is pushed below the coils when they are defrosted. The water collected in this portable pan is then wheeled out of the blast freezing room and dumped in an outside drain.

The original specifications did not contemplate complete automatic operation of the refrigeration system, nor is it now completely automatic. Compressors, brine pumps, water pumps, etc., are started manually. Certain equipment failure devices were called for to shut down the compressors due to high discharge pressure, oil pressure failure and low suction pressure. It was pointed out, however, during negotiations, that additional equipment failure protective devices were desirable because the plant would be unattended for up to 16 hours each night when no warehousing activity was going on. Item 5, therefore, came into the picture as a desirable objective.

The building contents would be protected by the usual ADT Company burglar alarm protection system. Investigation revealed that by means of another ADT circuit it was possible to secure equipment failure alarm protection. Accordingly, a system of this nature was installed which transmits a signal to the ADT Company office upon the failure of certain mechanical equipment or upon abnormal temperature or pressure conditions in the plant. When ADT Company receives such a signal over the equipment failure circuit, they immediately try to contact by telephone, first the plant engineer, and if he can't be located, then a refrigeration service organization designated by Merchants Refrigerating Company. The plant engineer or the refrigeration service man, whichever the case may be, then can go to the plant, ascertain what caused equipment failure, make necessary correction, and place the plant back into proper operation.

Certain of these controls not only send a signal to alert ADT Company of an equipment failure, but they are also wired up in such a manner that mechanical equipment will be shut down in order to prevent serious damage to the refrigeration system. Protective devices and their function are shown on the following chart. The controls that shut down the plant are additionally wired to indicating lights. These will light up and remain lighted so that the person answering the ADT Company call can immediately determine which control caused the shutdown by means of these lights. Thus, valuable time is gained in again placing the system in operation.

National Food Distributors Hold Annual Meeting

IN record breaking numbers, distributors attended the various meetings and panel sessions held at the Twenty-fifth Silver Jubilee of the National Food Distributors Association at the Sherman Hotel August 11-14, 1952. Emphasis was on modern sales, manufacturing, merchandising, and management methods. Some of the outstanding speakers brought out the urgent need for everyone engaged in the food industry to keep up with, participate in, and influence political developments on a local and national level, so that personal industry and initiative will not be abrogated, or regimented any further by government bureaucracy.

"The food industry, like most others, must be alert to the danger of Government control and regulation of business." This disturbing situation was brought out by Edward A. Mitchell, a food distributor and former Indiana Congressman from Evansville, and was further emphasized in the keynote address by Samuel Fraser, the executive vice-president of the International Apple Association of Washington, D. C.

The Natitonal Food Distributors Association, although it is an international association, having members in all parts of the United States, Canada, Mexico, and other foreign countries, is composed primarily of a group of individuals united for the express purpose of furthering and developing in the true tradition of our country the thousands of food products being distributed in over a million food outlets. It was pointed out that such a progressive group represents individual enterprise, and makes it possible for quality food manufacturers to get national distribution for their products in the simplest, most direct, and economical way.

Tom Cuneo, president of the Association, who is himself an important food distributor in Memphis, Tenn., pointed out that the final outcome of their discussions brought out the necessity of including the consumer, as well as the retailer, and manufacturer, and give first and foremost important consideration to the placing of foods in consumers' hands the most economical way possible.

Mr. Cuneo further emphasized the fact that the growth of the service distributors has kept pace with the progress of modern transportation, upon which the rapidly changing picture of food distribution so vitally depends. There are promises for even a more rapid expansion in the sale of perishable and semi-perishable food items in the immediate future with a resulting reduction of prices to the consumer, and larger profits to the rteailer —through quicker turn-over of fresher stocks.

The first day luncheon paid special tribute and acknowledgment to over 20 food distributors who were at the first group meeting at Cleveland, Ohio, 25 years ago.

On Tuesday, the real peak of interest was the testimonial dinner given in honor of Emmet J. Martin, secretary of the organization since its inception in Cleveland twenty-five years ago. This voluntary and much deserved tribute was given by industry members who launched their praise after the opening remarks by Mayor Martin H. Kennelly of Chicago, who stated that Mr. Martin's vision and courage, integrity and perseverance had built the Association into an international organization devoted to the interest of all those engaged in food distribution service. Secretary Martin entered the Louis XVI Room of the Hotel Sherman to a standing ovation rendered by over 500 food distributors and manufacturers.

During the four day session, special meetings, clinics, and panel sessions were held relating to individual facets of the industry, including frozen foods.

The convention had a record of over 8,000 in attendance, and over 300 distributors who are looking forward to the 1953 meeting, which will be held in the third week in August at the Hotel Sherman, Chicago.

Break-Even Point a Handy Device—It Shows Dividing Line Between Costs and Profits

THE break-even point is a costing device that has been used in big industrial plants for years. Sometimes the cost accountants use charts or graphs, at other times they use tables of figures. The break-even point is the point where business costs (the cost of sales plus overhead expense) and sales volume in dollars meet; above that point the net profit begins. The business man can prepare break-even figures for his business as a whole, and if the books are kept right, they will reveal ample information along these lines. The value of the break-even point in this field is in finding the dividing line between a "making" and a "losing" route.

Must Know "Break Even" Point

Executives should know this break-even point because they can lose substantial sums if they do not. The financial accounts are not kept according to these classifications and our accounting experience in this field shows that often certain routes, or salesmen, are losing propositions, and the ice man does not know it because he lacks the costing system to find out the facts. With just a few hours preparation, the average manager can get a pretty good idea where the break-even point is on any route's productivity. It isn't necessary to have an expensive costing system installed or to hire outside experts. Of course, the more complete the books are, the more accurate the final result. But, the calculation does not require 100 per cent accounting accuracy, thus it is not essential to follow the strict rules of accounting practice.

For the purpose of our audits, and to find out the reason for profits on the books, we have devised a simple method for determining approximately where the break-even point is on route operation. Any manager can use this plan to advantage. The calculation is on the basis of dollar sales per month as the starting figure. The dollar volume can be obtained from each route per month.

The figures are posted on a work sheet, a sample of which is shown with this text. The total sales and business costs are listed down the left side and a breakdown of these sales and costs are listed across the sheet under columns designated to the different routes. Three methods are used in calculating the allocations to routes. The first is the direct allocation, which covers the compensation paid each routeman. This is readily determined from the payroll figures. The second type of allocation is on a percentage basis. The category allocated on a percentage basis is total production cost. For example, if the cost of producing ice, including plant overhead, for the month is $6,500 and sales are $10,000, then the ratio of the cost of sales to sales is 65 per cent. We assume that the sales-cost ratio is uniform for each route, and we allocate this expense to each route on this percentage basis (65 per cent).

This percentage calculation is not entirely accurate. The profit is different on different types of commodities sold and one route may sell more of its share of the profitable lines than another route. However, the only other approach to this computation would be to apply unit-costs times unit-sales and this involves too intricate a calculation for the average small business and so, we use a definite percentage chargeable to each route and find that it works out satisfactorily, it spots the losing routes even if it doesn't mirror exactly the differentials in their profit-productivity.

Commercial Overhead

The next step is to figure out and total the major items under commercial overhead, as shown on the accompanying tabulation. The third method of allocation is to assign commercial overhead expense to each route on an equal basis. Each route bears the same amount of burden in dollars. If you operate, say, four routes and commercial overhead is $2,000, then each route will absorb $500 of the burden.

Granted again, that this is not 100

WORK SHEET SHOWING ROUTE PROFIT OR LOSS REPORT

Month.....

Category	Totals	Route No. 1	Route No. 2	Etc.
Routeman compensation	2,000	308	264	
*Cost of sales—65%	13,000	2,600	1,950	
Delivery and collection	1,400	280	280	
Sales promotion	600	120	120	
Office expense	1,000	200	200	
Administrative	1,200	240	240	
Dollar Sales	$20,000	$4,000	$3,000	Etc.
Total costs	$19,200	$3,748	$3,054	Etc.
Profit or loss	P.—$800	P.—$252	L.—$54	
% profit or loss	P.—4%	P.—6%	L.—2%	

*Cost of labor, materials and plant overhead on ice production. On merchandise bought for re-sale, the cost of sales is the cost of the goods purchased plus incoming transportation charges.

This specimen compilation covers only two routes. The manager should follow the same calculation procedure on as many routes as he operates, listing their dollar sales at the top and charging against these sales the cost of ice production plus commercial overhead, the former on a percentage basis taken from the books, the latter allocated to each route on an equal basis.

In this case, 4 per cent net profit was earned on sales for the business as a whole. Route No. 1 earned 6 per cent, more than the average net for the business; Route No. 2 lost 2 per cent, pulling down the over-all net, which would have been more had both routes earned a profit.

This occurs in many plants where the management does not prepare profit and loss reports on routes or salesmen and depends entirely upon the compensation in ratio to sales for the business as a whole to gauge selling efficiency or productivity. This calculation obscures the "weak sisters" and they continue to depress the net profit for the management.

Route salesman compensation is charged direct, the figures taken from the payroll records, the cost of sales is charged to each route on a percentage basis as explained in the text, the commercial overhead is distributed equally to each route.

The listings under "Category" depend upon the operating set-up. If you wish to enter all accounts as per books, that is Okeh. We have grouped them for simplicity.

The same form and recording technique may be used for outside salesmen selling appliances or inside salesmen. A different form should be used for each classification of salesmen.

per cent accurate. For example, on payroll taxes, the route salesman who gets the most money costs a little more in compensation plus tax, but the difference usually is not large enough to warrant applying a separate cost to each route. The same holds for most other commercial overhead expenses covering selling, delivering and administration. It all depends upon the operating figures. If selling and delivery costs are about the same, the method of equal allocation will suffice to point up the "weak sisters". In fact, direct allocation, if feasible would not likely be more accurate than equivalent allocation, and direct allocation would probably take such a mass of paperwork that it wouldn't pay to do it.

Reduce Paper Work

There is a good accounting maximum that should be remembered, "Never spend a dime to save a nickle." Cost accountants know that if you wish to be precise on cost work, as precise as you are on your financial accounts, you will pile up paperwork at great expense and they warn against this danger. However, if the manager knows that one route's expense on selling, delivery and administration runs substantially higher than average, he should take cognizance of this fact when compiling his costs on the "Route profit or loss statement".

Wherever records are already being kept that will provide for direct allocation, that should be done. For example, if individual truck operating records are being kept, these may be applied directly to each route, instead of pro-rating truck expenses equally. Lacking individual records on trucks, they may be allocated equally, but here again, this is not precision accounting, yet, it will suffice to get the information needed to maintain maximum cost control. Route No. 1 for instance, may be a long route, consuming more gasoline, oil, truck repairs, etc., than Route No. 2 which may be only about half as long, hence, there will be a variance in costs not reflected by equal distribution to all routes.

Some managers using the break-even point method of segregating the "weak sisters" from the profitable routes, charge each truck with its true share of depreciation, instead of dividing this charge equally. This is possible without the use of individual truck operating records. The information may be obtained from the depreciation schedules showing the cost of the truck and the estimated years of useful life. The route which the truck covers is then charged with its annual depreciation expense.

Others however, contend that the equal distribution of truck depreciation is more logical, because the trucks may be switched from route to route during the year, as is often the case. Then too, the individual route profit may be distorted by the age and the condition of the truck covering it. A truck of ancient vintage or in poor condition will record a high operating cost for one route and depressed profits, whereas, a brand new truck will show little operating expense and higher profits, a relative condition not due to selling efficiency or route management. The reader can make his own decision based on the conditions that exist in his organization. In most cases, it will work out satisfactorily either way.

Business Soliciting by Salesmen

The method outlined here can be used to gauge the selling profitability of salesmen who solicit business apart from route work. The usual procedure for gauging the profitability of route salesmen or salesmen on straight solicitation is to take the total selling compensation in ratio to sales and if it is average for the business, it is considered Okeh. This calculation is not a safe one, except to assure the manager that his selling expense is not getting out of line on an over-all basis. But, it doesn't tell him how his routes produce relatively, and this information he should know in order to make maximum profit on the business as a whole.

For example, the losing route on the accompanying tabulation has a ratio of about 9 per cent routeman compensation to sales, whereas, the profitable route has a ratio of about 8 per cent compensation to sales for the routeman covering it. The difference of only one per cent in this ratio does not reflect the big difference in the net the profitable route earned for the business, 6 per cent against 2 per cent loss on sales for the losing route. On the basis of the figures shown, both routemen received $572 for the month's work and made $7,000 in sales. This is about 8 per cent compensation to sales.

By combining the figures, and this is the result when the ratio of routeman or salesman compensation is taken to sales for the business as a whole, the record of the losing operator is obscured. If the ratio is in keeping with prior experience figures and give a seemingly satisfactory profit on over-all operation, the manager may go no further and assume that all routes or salesmen are doing a satisfactory job, when one or more may be losing money for him. In this example, we use only two case histories, but the calculation would work out the same way if there were 10 or more breakdowns of sales productivity.

The break-even point is also advantageous when budgeting operations for a forthcoming period. You determine your over-all costs and then you add the anticipated profit. Where the over-all costs meet the sales volume is the break-even point.

Better business planning is a "must" today if you want to earn a satisfactory profit in these hectic times. The break-even point is a managerial gadget that will help you plan for maximum profit.

Executive Asks Separate Conventions and Shows

THE National Frozen Foods Industries Exposition, under the management of the Frozen Foods Exposition of America, will be held at the Grand Central Palace, New York, April 20-23, 1953.

Whether to hold a convention and a trade show together has been a moot question among association secretaries and committee chairmen. Adolph Strauss, consultant for the Frozen Foods Exposition of America, feels that the fusion of a trade show and convention is not likely to make for a happy combination because each has a function of its own to perform, and the blending of the two would be detrimental to both.

Mr. Strauss says that in order to do justice to an assignment, an executive attending a convention must give the meetings his undivided attention without worrying about appointments elsewhere, and no responsible executive can afford to miss any of the varied aspects of these meetings if he wishes to derive the fullest benefits of the findings.

On the other hand he feels exhibitors at an exposition want to receive undivided attention from the buyer, unhampered by any outside interest. The exhibitor does not want to feel that the buyer has only a limited time available to spend at his booth. When he spends money to buy booth space, he wants the concentration of sales thinking and it is the responsibility of the directors of the trade show to see to it that the exhibitor's efforts result in sales and good will. To attend both the convention and an exposition and absorb all that each has to offer, Mr. Strauss says, is asking too much of any individual.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

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Executive Vice-president
WM. DALTON, WASHINGTON, D.C.

Secretary
JOS. H. COLQUITT, WASHINGTON, D.C.

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CHAS. B. HART, TACOMA, WASH.

THIS MONTH IN BRIEF

Cold storage holdings for August 31 were about the same as previous months, 63 and 78 percent respectively. Cooler utilization was down two points from last year and freezers were about the same.

Results of a survey on refrigerated storage of candy shows that warehousemen have facilities and space for 15,350,000 pounds of candy. It also shows a growing realization on the part of candy manufacturers and wholesalers of the advantages of storing their products under refrigeration.

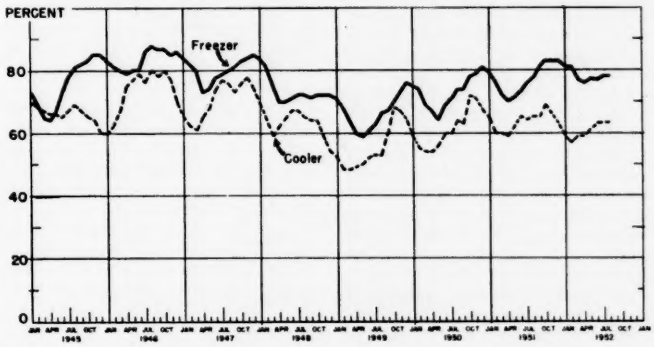
A government marketing research report just issued shows the need of refrigerated storage service for frozen foods, and the value of such service that is available to frozen food manufacturers and distributors from public refrigerated warehouses. It points out that in many instances better service at lower cost is offered than can be provided by a privately owned facility.

Cold Storage Holdings August 31

ACCORDING to reports received by the Department of Agriculture from public warehousemen, cooler and freezer space occupancy on August 31 was 63 and 78 percent respectively which was about equal to the occupancy levels reported last month. However, cooler utilization was two points below the level reported last year and the August 31, five-year average. On the other hand, the reported use of freezer space was equal to last year's level but exceeded average end-of-month occupancy by four percentage points. While the national occupancy on August 31 reflected no change from the previous month, only the Middle Atlantic region reported an increase in use of cooler and freezer space, which was in accordance with the 5-year average pattern.

Unlike previous performance, the net change in storage weights during August for freezer held commodities was an adjustment downward of approximately 85 million pounds thus leaving 2.2 billion on hand at the end of August. An increase in weight generally prevails during this time of year as evidenced by the 45 million pound increase in freezer stored commodities reported last year this time and a gain of 28 million pounds reported during the five-year period ended 1951.

Accounting for the significant net reduction in storage holdings during August were frozen eggs, poultry, and meats which more than countered the



Occupancy of Refrigerated Warehouses, 1945-1952

TABLE 1—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	Aug. 31, 1952	July 31, 1952	Aug. 31, 1951	Five-year Average
Meat and meat products, lbs.	693,449	850,405	605,151	504,804
Lard and rendered pork fat, lbs.	122,759	132,583	34,702	96,267
Frozen poultry, lbs.	141,631	157,045	121,493	116,279
Creamery butter, lbs.	112,173	99,751	116,790	139,206
American cheese, lbs.	224,934	211,477	233,788	211,974
Other cheese, lbs.	22,860	21,819	26,610	26,271
Shell eggs, cases	2,160	2,728	1,615	2,805
Frozen eggs, lbs.	144,801	163,359	176,273	189,274
Apples, bu.	229	153	293	...
Frozen fruits, lbs.	314,912	305,641	380,264	347,334
Frozen vegetables, lbs.	467,237	385,494	445,724	343,280
Frozen fish, lbs.	180,295	176,254	161,628	146,091

TABLE 2—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		1952 (%)		1952 (%)		1951 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	2,870	6,160	36	73	37	72	36	87	47	76
Middle Atlantic	28,785	32,119	57	83	55	80	56	83	55	77
East North Central	28,643	27,145	73	81	77	80	76	77	74	71
West North Central	8,315	16,195	70	71	72	78	65	75	74	75
South Atlantic	8,096	10,039	66	73	66	78	67	80	65	75
East South Central	2,344	3,527	89	89	82	91	72	87	76	82
West South Central	7,138	7,516	64	61	65	63	65	61	65	60
Mountain	1,185	2,580	60	76	67	76	53	72	64	75
Pacific	15,280	20,451	51	79	51	75	69	77	65	75
United States	102,656	125,734	63	78	63	78	65	78	65	74

net accumulations of frozen fruits, vegetables, and butter. Cooler stored items totaled 1.4 billion pounds a gain of 109 million pounds since July 31. The August net accumulations were less than half the storage gains reported last year and about two-fifths less than average. Stocks in cooler storage have not been this low on August 31 since 1944 as a result of significant August net withdrawals of dried and evaporated fruits, nuts and nutmeats, shell eggs, dried eggs, and meat products.

Holdings of fresh apples increased to 229,000 bushels by August 31 while fresh pears totaled 3.8 million bushels. Stocks of apples were about equal to those last year but holdings of pears were about half the August 31, 1951 stores. Also reflecting seasonal gains were holdings of fresh grapes, other fresh fruits, and onions while net decreases were reported for celery, other fresh vegetables, dried and evaporated fruits, and nuts in shell and shelled.

A net gain of 9 million pounds in frozen fruit holdings during August brought national holdings up to 315 million pounds by the end of the month. This compares with a seasonal increase of 63 million pounds reported last year and a 39 million pound increase indicated by historical performance. Frozen cherries—60 million pounds—were the lowest for this time of year since 1945 as stocks increased only 6 million pounds during August which compares with a gain of 32 million reported last year and a 23 million increase during the five-year period ended 1951. Although frozen strawberry holdings were down to 130 million pounds—a decrease of 10 million during August—stocks were at an all time high for this time of year. On the west coast, stocks totaled almost 60 million pounds while holding in the Middle Atlantic and East North Central warehouses totaled 19 and 20 million pounds, respectively.

A record into-storage movement of 109 million pounds of frozen vegetables during August brought the national total up to 467 million pounds which exceeded the previous August 31 record high reached last year by almost 22 million pounds. Reaching new record highs for the month were holdings of frozen lima beans (43 million pounds), snap beans (66 million pounds), green peas (199 million pounds) and spinach (48 million pounds). Holdings of green peas were not only at a new August 31 high but also bettered the previous record high for any month by almost 7 million pounds.

Holdings of frozen orange concentrate fell off during the month to a little more than 20 million gallons as net withdrawals during August totaled 3 million. Stocks of other frozen juices and purees reflected a slight adjustment downward during the month.

Holdings of creamery butter totaled 112 million pounds which compares with 117 million in store last year and 139 million in store on August 31 during the five-year period ended 1951. Thus, peak holdings of butter this year were about four percent less than at the comparable period a year ago and about 20 percent less than average.

Increases in storage holdings of American cheese during August brought end-of-month stocks up to 225 million pounds—a gain of 14 million from the previous month. Total for all cheese in storage was 255 million pounds which compares with almost 270 million pounds on hand last year and average August 31 stocks of 243 million pounds.

A net-disappearance of almost 600,000 cases of shell eggs brought national holdings down to 2.2 million cases which was less than average for August 31 but greater than last year's stocks. Almost half the national stores were in East North Central warehouses while Pacific coast and West North Central facilities each held almost one-fifth of the total.

Stocks of frozen eggs on hand August 31—145 million pounds—were the smallest since 1939 yet the net increase in stocks during the month was above average and greater than last year.

TABLE 3—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Aug., 1952		Space Occupied—Per Cent July, 1952		Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Aug., 1952		Space Occupied—Per Cent July, 1952	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	.....	.....	..	..	50	50	.....	.....	..	..	66	..
Middle Atlantic	1,643	1,403	37	50	54	55	970	228	95	86	95	87
East North Central	3,371	4,761	74	46	74	52	3,617	852	88	80	82	80
West North Central	522	2,348	77	80	74	84	3,046	3,185	87	90	84	95
South Atlantic	595	2,006	12	49	11	53	.....	.....	..	..	100	100
East South Central	105	129	..	10	..	14	.....	.....	..	..	88	89
West South Central	39	4	100	100	28	100	75	116	100	100	100	100
Mountain	.....	.....	..	..	95	100	.....	.....	..	..	90	100
Pacific	1,416	3,255	69	82	50	64	491	267	90	92	73	88
United States	7,691	13,906	60	61	61	59	8,199	4,648	89	89	84	93

NOTE: Blank spaces indicate that insufficient returns were received.

Poultry net withdrawals—15 million pounds—were in contrast to an average increase of 7 million pounds usually reported during August, and by the end of the month frozen poultry stocks were down to 142 million pounds. These holdings were the largest since 1947 and the fourth largest on record for any August 31 since 1915. Stocks of turkeys—42 million pounds—reflected an August decrease of 4 million pounds, while holdings of ducks increased about 2 million pounds to 16 million pounds.

About one and a half times as much meat moved from storage during August as did during the comparable month in the five-year period ended 1951. Last month the net disappearance was 157 million pounds leaving on hand August 31 a little more than 693 million pounds which were about a third greater than the average total meats in store and about one-sixth greater than stocks last year.

Frozen pork holdings were reduced to 239 million pounds by August 31 while total pork holdings were down to 402 million pounds. Since April 31, when over 823 million pounds were in storage, net withdrawals have averaged over 100 million pounds a month.

Beef stocks fell off to 157 million pounds as a result of a net reduction in frozen beef holdings of more than 4 million pounds during August. Average net withdrawals of frozen beef have been 19 million pounds per month since March 31 when almost 245 million pounds of frozen beef were in storage.

Storage Outlook

August 31 cooler utilization—63 percent—was below the August 31 average and the occupancy reported in 1951. It was expected that occupancy would increase during August as indicated by the five-year average pattern, but it remained unchanged from the previous month as the net into storage movement of cooler items fell far short of all previous performance. However, with the advent of the apple storage season, cooler occupancy should increase during September. Although significant amounts of frozen vegetables moved into storage during August, end of month freezer occupancy did not increase because this movement was countered by heavy net withdrawals of frozen eggs, poultry, and meats. Yet, despite a leveling off in freezer occupancy during August, it is unlikely that the upward trend in freezer occupancy will be halted and by the end of September the level reported should be greater than 78 percent.

Refrigeration a Must for Packaged Produce

IMPROVED methods for prepackaging fresh fruits and vegetables are coming from extensive tests conducted under the Research and Marketing Act of 1946, say scientists of the U. S. Department of Agriculture. The tests emphasize the importance of refrigeration in keeping packaged commodities fresh.

Results are giving precise information on the type of films best suited for packaging different fruits and vegetables, on the need for ventilation in films used to package certain products, and on the temperatures required to maintain freshness. The work is an important phase of the Department's studies on the handling and transportation of fruits and vegetables.

The recent findings, by the Bureau of Plant Industry, Soils, and Agricultural Engineering, which emphasized the importance of refrigeration, show for example that apricots in sealed film will maintain satisfactory quality up to six days when stored at 40 F., but will develop bad odors and off-flavors quickly if held at 65 F. Newly harvested and cured packaged sweet potatoes can be held satisfactorily for four weeks at 55 F., but only two weeks at 70 F. Carrots packaged in some types of film can be held for six days at 70 F., two weeks at 40 F., and three weeks at 32 F.

Onions, sweet corn, and broccoli spoil quickly when packaged in film that is not ventilated with small holes. Nutmeats, on the other hand, maintain freshness best when packaged in strong film that is moistureproof, airproof, and not affected by nutmeat oil.

The tests, under the direction of W. T. Pentzer, show that packaging in the right kind of film protects apples, oranges, and lemons from losses in weight. Liners of this film in fiberboard cartons reduced wilting and softening and enhanced the appearance of Golden Delicious apples. There was a little shriveling in lemons packaged in moistureproof film. Weight loss in oranges held at 70 F., and five percent humidity for six days was six percent for those in mesh bags but only two percent for those in film bags.

Turkeys in Storage

A SURVEY of turkeys in storage will be conducted by the National Association of Refrigerated Warehouses in cooperation with the Institute of American Poultry Industries. The survey will be made as of the close of business September 30. The information to be gathered will be brief but essential to the orderly marketing of this year's large turkey crop.

Refrigerated Warehousing

Turkey Purchase Program

THE U. S. Department of Agriculture has announced a program which provides for the purchase of frozen, ready-to-cook 1952 crop turkeys as a means of providing an outlet for temporary surpluses of turkeys which are resulting in unfavorable prices for producers.

In announcing the turkey purchase program, Secretary of Agriculture Charles F. Brannan said, "This year's turkey crop is expected to be the largest on record. The August estimate is for nearly 59 million turkeys, nearly 13 percent more than were produced last year. This will undoubtedly mean plenty of turkey at reasonable prices for the nation's housewives. In addition, it should mean plenty of turkey for our school children's lunches and for donation to eligible public institutions. To make sure of this and to help maintain prices at levels that are fair to turkey growers, the Department is offering to buy turkeys to the extent that it has outlets available."

The turkeys purchased will be distributed during the coming school year to non-profit school lunch programs and to other eligible outlets. The purchases will be made with "Section 32" funds provided by Congress to encourage consumption of agricultural commodities by diverting surplus quantities from normal channels of trade.

The purchase program will be operated on a competitive bid basis. The turkeys will be purchased in carload quantities from dealers and others who submit their bids to the Poultry Branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C. The bids will be received on Tuesday of each week beginning September 9 and continuing through January 27, 1953. Acceptance will be made on or before the following Friday of each week. Deliveries will be made through May 1, 1953. Purchases for delivery in any one month will be limited to the quantities for which there are known outlets.

Purchases will be limited to frozen, ready-to-cook, box-packed turkeys of U. S. grade B or better which were not slaughtered before September 1, and which have been inspected for wholesomeness by official USDA inspectors. The turkeys accepted must be delivered within 6 months from the date of slaughter to warehouses acceptable to the Production and Marketing Administration.

Columnist Comments on Refrigerated Warehousing

THE closing general session of the 61st Annual Convention of the American Warehousemen's Association held in New Orleans last May was addressed by Clayton Rand, noted columnist and public speaker. In a syndicated column titled, "New Deal on Ice," Mr. Rand reviewed the situation as follows:

I participated in a joint annual meeting of the American Warehousemen's Association and the National Association of Refrigerated Warehouses and heard members discuss the problems of their industry and its amazing growth.

J. P. Johnson, retiring president of the refrigerated warehousemen, told what his industry contributed to the wellbeing of 150 million Americans, serving as a family refrigerator for perishables. The refrigerated warehouses in America have storage space equal to a string of freight cars 1440 miles long, they employ 22,300 persons, paid out over $30 million in wages in 1951 and consumed 752 kilowatt hours of electricity. The warehousemen provide a market for the farmer's produce and preserve these edibles for later consumption.

Refrigerated Warehousing will become a gigantic industry if suspended animation is ever perfected. This dream of the scientists would make it possible for a person to go into a quick freeze if he didn't like the particular period or the peculiar politics of the time, and be thrawed out when the situation improved.

The warehousemen held a popularity contest in which Taft came first and Eisenhower second. If there is to be a political house-cleaning in Washington, the warehousemen of the country will have their biggest year in 1953, moving one party out and another in, and putting the old New Deal in cold storage.

Hart Plays Bridge

Charles B. Hart, Tacoma, Wash., treasurer of NARW and treasurer and general manager of the Tacoma Ice Co., also finds time to be an expert bridge player. Recently, according to "Cold Facts," he participated at Denver in the Rocky Mountain Regional Tournament of the American Bridge League, where he and his partner won the Open Pairs Championship. They then won second place in the first session of the All-Masters Tournament, then teamed with two players from Salt Lake City to place fourth in the Team of Four. This gave Mr. Hart and his partner the most master points won by any pair in the entire tournament.

Warehousing Dignitaries Enjoy Barbecue Party

ASSIGNED the task of disposing of 550 pounds of choice, grade A beef were A. B. Efroymson, president of the National Association of Refrigerated Warehouses, J. P. Johnson, immediate past president of NARW and 530 other beef-loving people.

The coup de maitre was pulled at the Brentwood, Md. home of Mr. Johnson, who is also Chairman of the Association's potent Legislative Committee. Mr. Efroymson, who was elected president at the recent NARW convention in New Orleans, made a special trip from Cleveland to be present.

The occasion was the 16th annual barbecue sponsored by the Terminal Refrigerating and Warehousing Corporation of which Mr. Johnson is vice-president and general manager. The presence of NARW's president at the affair marked the first time in 16 years any of the Association's presidents made a special trip to attend.

Others attending were 530 men from all walks of life. Prominent legislators, government agency heads, police chiefs of the area, food association officials,—and private detectives—rubbed elbows and shook hands. Also greeting President Efroymson and Past President Johnson were numerous warehousemen from the Atlantic States area.

The approximately two acres surrounding Mr. Johnson's home was jumping with activity, with all kinds of games, political huddles, refreshment offerings, and just plain fun.

Great Lakes Chapter

A MEETING of the Great Lakes chapter of the National Association of Refrigerated Warehouses will be held at the Hotel Statler, Cleveland, Ohio, Wednesday October 15. Harry Foster, chairman, announces that the meeting will start promptly at 9:30 a. m. and will adjourn about 4:00 p. m. Election of officers and luncheon will be included. Balance of the meeting will be utilized for discussion of current problems in the refrigerated warehousing industry.

Ubbe is Retired

WINDING up 21 years of active service to the company, its customers and the community, Ludwig Ubbe, president and general manager of the Los Angeles Cold Storage Company was retired on company pension August 1. His successor as general manager of the company is L. J. Urban.

Pacific States Association Quarterly Meeting

A QUARTERLY meeting of the Pacific States Cold Storage Warehousemen's Association will be held October 23 and 24, 1952 at the Clift Hotel, San Francisco. The meeting will start at 10 o'clock Thursday morning, October 23, and will close the afternoon of the following day. Luncheon will be served both days.

An interesting and constructive session has been planned. One of the highlights will be a field trip through the refrigerating facilities of the Western Regional Research Laboratory on the afternoon of October 23.

Both Bill Dalton and Dutch Diehl will be on hand to give reports concerning the national picture of their respective organizations. In addition, considerations will be given to certain problems which have been held over from past meetings, as well as important subjects such as personal property taxes, protection of limited liability through the issuance of proper warehouse receipts, format of tariffs and other subjects of general importance.

All those who expect to attend are urged to write for hotel reservations at once.

Boston Leaves OPS

COL. HAROLD BOSTON, formerly acting chief of OPS Storage and Terminal Facilities Section, known to many refrigerated warehousemen, has left OPS and his responsibilities there have been taken over by Amos Gall. Mr. Gall is chief of a newly formed Section which will probably be known as the Rail, Water, and Terminal Facilities Section.

Tax Amortization

A CERTIFICATE of necessity for tax amortization of new or expanded facilities has been approved by the Defense Production Administration for the Cincinnati Terminal Warehouse Inc.; amount certified $45,000 of which 55 per cent was allowed.

Dairy and Poultry Meet

THE Pacific Dairy & Poultry Association will hold its 29th annual convention at the Olympic Hotel in Seattle, Wash., March 5, 6 and 7, 1953. An interesting and informative program, covering discussion of current dairy and poultry industry problems is announced by the program committee.

Survey Shows That Warehousemen Would Like to Store 15,350,000 lbs. of Candy

J. G. WOODROOF*
Georgia Experiment Station
Experiment, Georgia

Refrigerated storage rooms for candies should be dry, clean and orderly with air well circulated. The relative humidity should be about 60 per cent with a temperature from 40 F. to minus 10 F. depending on the type of candy and the length of storage. The photograph at the right shows Dr. John Steiner, Miner Laboratories, in a well kept refrigerated warehouse in Chicago.

IN RECENT years there has been an increased interest in refrigerated storage of candies. This stems from three sources.

First, from the confectioners: Most of the finest boxed candies are seasonal, reaching the peak of demand at Thanksgiving, Halloween, Christmas, Valentine's Day, Easter, and Mother's Day, with a decided decrease in demand during the summer and fall. By stockpiling candies where they would remain firm, dry, and free from insects, mold, and rancidity the manufacturing operation could be continued fairly even throughout the year. Most of the larger manufacturers of boxed or bulk candies are becoming very much interested in the potentialities of refrigerated storage of candies. Some of them would like to freeze them. Candies containing nuts or a high fat content may require temperatures at or below freezing.

Second, from the warehousemen: Candies have been successfully refrigerated from one to six months or longer at temperatures ranging from 65 F to minus 10 F. A few warehousemen successfully stored candies for several years and see considerable possibility for expansion, while others have been skeptical. Lack of interest on the part of warehousemen seems to be due to: (a) they are not located in a candy manufacturing area; (b) they are located in an area where humidity conditions make the removal of candies without condensation very difficult; (c) they do not have available rooms with the proper temperature, humidity, and where candies can be stored away from other products.

Third, from the Quartermaster Corps: Refrigeration is becoming more available to the Armed Forces both for the storage and transportation of food items. (Ice cream is being served to soldiers in the front lines in Korea.) Experience is showing that candies, among other foods, are much better when held under refrigeration from the time of manufacture to consumption.

Survey of Warehousemen

To determine the present and future status of refrigerated storage of candies, questionnaires were sent to members of the National Association of Refrigerated Warehouses and The Refrigeration Research Foundation in June 1952. Replies were received from 138 warehousemen, of which 36 stored candy. The questions, answers, and comments follow:

How many pounds of candy did you store under refrigeration in 1945, frozen, and unfrozen; and in 1951, frozen and unfrozen?

Of the 36 warehouses storing candy, 15 were located in the south, 11 in the mid-west, and 5 each in the west and east. From 1945 to 1951 there was an increase in the storage of 36 and 38 per cents in pounds of frozen and unfrozen candies, respectively.

At what temperature did you store candies?

The preferred temperature for storing candy was 32 F or slightly above, while 40-50 F was next preferred. Four of the warehousemen stored candy at 60-70 F, while three of them stored from 0-10 F.

At what relative humidity did you store candies?

The lack of consistency and agreement as to the relative humidity is indicated in the replies. In fact, none of the warehousemen carried exactly the same relative humidity. Of 35 reporting the humidity carried in candy

TABLE I. COMPARATIVE FIGURES OF 1945 AND 1951 CANDY STORAGE

		1945		1951	
Reported from location	Reporting number	Frozen pounds	Unfrozen pounds	Frozen pounds	Unfrozen pounds
South	16	175,000	8,043,500	450,000	21,606,500
West	6	325,000	300,500	180,000	1,950,000
Middle West	11	50,000	943,900	3,480	4,365,397
East	5	0	3,000,000	0	4,747,167
Total	38	550,000	12,287,900	633,480	32,669,064

*Survey conducted in cooperation with The Refrigeration Research Foundation and the National Association of Refrigerated Warehouses. Questionnaires were mailed to members by William Dalton, secretary N.A.R.W.

Published as article No. 229, Journal Series, Georgia Experiment Station.

TABLE II. TEMPERATURE PREFERENCE

Temperature Degree F.	Warehousemen who preferred these temperatures
60-70	4
50-60	6
40-50	9
32-40	16
0-10	3
Total	38

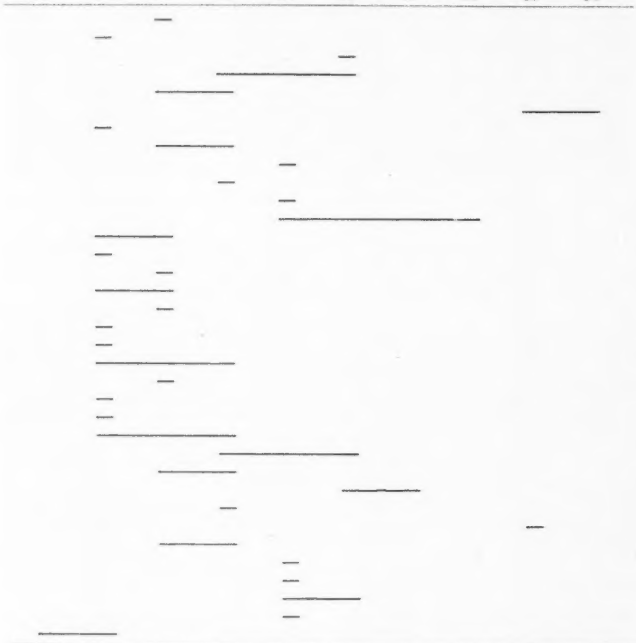
storage rooms, 20 maintained a relative humidity from 50 to 55. The relative humidities are as follows:

What disadvantages, or complaints, have you experienced from refrigerated storage of candies?

None	12
Gathers moisture upon removal	5
Chocolate became discolored	2
Short hold, excessive handling cost	2
Had law suit	2
Had bad claim on poorly packaged hard candies	1
Packages were damaged unless shipped in reefer cars	1
Hard candies suffered excessive breaking after removal from storage	1
Humidity too high	1
Unable to stack high	1
Total	28

TABLE III. RELATIVE HUMIDITY — PER CENT

45 50 55 60 65 70 75 80 85 90



What advantages have you experienced from refrigerated storage of candy?

None	4
Considerable new business	3
A good storage item	2
Elimination of holiday rush by manufacturer	3
A good fill-in commodity for summer storage	4
Longer lasting quality	2
Best method of preserving candy	2
Revenue from normally marginal space	1
Carried Easter candies from one year to the next	1
Nice clean product to handle	1
Total	23

Have you experienced stored candies being injured by other products?

None of the 28 answering this question reported injury from other stored products, because the candy was stored in a separate room from all other products.

What difficulties, if any, have you experienced in receiving, stacking, piling, or otherwise handling candies for storage?

None	17
Very little	3
Cases crushed because too light and frail	3
Too many kinds of sizes and kinds of lots	4
Difficulty in maintaining low humidity	2
Total	29

The rates for storing candies would be in line with what other products?

Most of the warehousemen believed that rates for storing candies should be in line for storing dried fruits, shelled and unshelled nuts, and cheese.

Dried fruits, raisins, dates, and cheese	13
In line with other commodities of similar density and value	3
Higher than some other products	3
Shelled and unshelled nuts	3
Higher because of increased risk involved and extra care in handling	2
Lower in price due to higher temperature	1
In line with ice cream novelties	1
Separate from any other product	1
Should be 1½ times higher than other products	1
Dairy products	1
Total	29

Do you consider candies a profitable item for refrigerated storage?

Yes	28
No	3
Uncertain	7
Total	38

How much WOULD YOU LIKE to increase storage of candies in 50 to 65 F., 32 to 40 F., and 0 to 10 F.?

Of the 141 questionnaires returned, 9 indicated a desire to increase the storage of candies by 21,560,000 pounds at the temperature range of 50 to 65 F., in amounts as follows:

Pounds	Pounds
20,000	300,000
40,000	300,000
200,000	500,000
200,000	2,000,000

A considerable amount

Total 3,560,000 pounds

Sixteen indicated a desire to increase the storage of candies by 9,110,000 pounds in the temperature range of 32 to 40 F., in amounts as follows:

Pounds	Pounds
10,000	200,000
40,000	250,000
50,000	500,000
50,000	500,000
60,000	1,000,000
100,000	1,000,000
150,000	5,000,000
200,000	

A considerable amount

Total 9,110,000 pounds

Eleven indicated a desire to increase the storage of candies by 2,680,000 pounds in the temperature range of 0 to 10 F., in amounts as follows:

Pounds	Pounds
20,000	200,000
50,000	250,000
60,000	300,000
100,000	500,000
200,000	1,000,000

A considerable amount

Total 2,680,000 pounds

The total amount of candy which warehousemen wish to store is:

Temperature degree F.	Pounds
50 to 65	3,560,000
32 to 40	9,110,000
0 to 10	2,680,000

Total 15,350,000 pounds

How much CAN YOU increase storage of candies at the present time in the temperature range 50 to 65 F., 32 to 40 F., and 0 to 10 F.?

Pounds	Pounds
40,000	500,000
200,000	1,500,000
500,000	300,000
500,000	3,000,000

Total 6,540,000 pounds

Ten reported that they can store 2,910,000 pounds of candy at the temperature range of 32 to 40 F., as follows:

Pounds	Pounds
10,000	150,000
40,000	200,000
50,000	300,000
60,000	1,000,000
100,000	1,000,000

Total 2, 910,000 pounds

Eight reported that they can store 1,830,000 pounds of candy at the temperature range of 0 to 10 F., as follows:

Pounds	Pounds
20,000	100,000
50,000	250,000
50,000	300,000
60,000	1,000,000

Total 1,830,000 pounds

The total amount of candy which warehousemen can store at the present time is:

Temperature degree F.	Pounds
50 to 65	6,540,000
32 to 40	2,910,000
0 to 10	1,830,000

Total 11,280,000 pounds

Excerpts From Replies

From Jersey City, New Jersey: Until very recent years, we were one of the very few, if not the only house in the New York area who would store candy because of some fear of claims due to storage. We have never had a claim resulting from storage conditions.

From St. Paul, Minnesota: Candy was a real storage problem here until we changed our temperatures to 50 F., at which time the humidity took care of itself and the candy came out of storage in wonderful condition.

Kansas City, Missouri: We have carried candy in our automatic controlled temperature and humidity rooms since 1948 as a test, and find this candy still in good condition.

From Boise, Idaho: Chocolates easily become sticky. Watch them!

Vancouver, B. C., Canada: Very little candy is stored here, but I think it is a line which can be developed. I intend to try it.

From Chattanooga, Tennessee: We hold our humidity by using one refrigerated coil on at all times and if needed to warm the room, we have a special electric heater.

From Tampa, Florida: Our experience with candy storage has not been too satisfactory because of candy sweating when removed from storage.

New Orleans, Louisiana: We find the best range for candy in cooler is 45 to 50 F. with humidity of 50 to 55 percent or lower if possible. At zero temperature it is necessary for the candy to be in special cartons in order to prevent formation of condensation on the candies after they are withdrawn from storage.

From San Antonio, Texas: We tried to interest candy customers in zero temperature storage, but they could not see it. We are interested in candy in volume and would endeavor to arrange for 65 F. temperature and low humidity if it was carried in storage the year round.

Phoenix, Arizona: We only store candies at owners risk.

Experts Examine Refrigerated Candy

SEVEN candy experts representing the National Confectioners' Association, Quartermaster Food and Container Institute and the Southern Regional Research Laboratory held a a two day candy eating session at the Georgia Experiment Station Griffin, Ga., on August 14 and 15 when they scored over 200 samples of candy for taste, texture, appearance and other characteristics.

The sampling was held in connection with the research projects being sponsored at the Experiment station by the National Confectioners' Association and the Refrigeration Research Foundation and by the Quartermaster Food and Container Institute.

One group of candies contained 58 varieties of commercial candy which had been stored at 0F. for varying lengths of time for the purpose of determining the exact behaviors of a wide variety of candies when frozen. Each candy was scored separately by each of the seven experts on 14 different points.

The second group of confections tested were those prepared according to thirty formulas for military rations.

In attendance at the two day conference were H. B. Cosler, Quartermaster Food and Container Institute; Helen Robinson, NCA Candy Project, Southern Regional Research Laboratory; G. Lloyd Latten, Schutter Candy Co.; Justin J. Alikonis, Paul F. Beich Co.; John O'Rourke, Mars, Inc.; Robert B. Schnering, Curtiss Candy Co., and Walter Richmond, Norris Candy Co.

Candy experts examine over fifty varieties of commercial candy which have been frozen for various lengths of time at the Georgia Experiment Station. The research work was sponsored by the National Confectioners' Association, the Refrigeration Research Foundation and the Georgia Experiment Station.

Warehousing For Frozen Foods

Marketing Research Report shows value of storage service provided by public refrigerated warehouses for wholesale frozen food distribution plants.

PUBLIC warehousemen who are specialists in the field of refrigeration and storage usually offer good storage conditions for frozen food wholesale distributors, according to a marketing research report on Planing a Wholesale Frozen Food Distribution Plant issued by the Production and Marketing Administration of the United States Department of Agriculture. Storage in public warehouses, it continues, permits the wholesaler to operate with less capital investment in facilities; also it affords him and his suppliers an opportunity to obtain loans on stocks in storage.

In planning their operation, it is pointed out that frozen food wholesalers can arrange for storage in one of several ways: (1) Store all except working stocks in public refrigerated warehouses or in packer's private warehouses; (2) provide long term storage space in their own plants for a part of their inventories and store the remainder in public or packers' warehouses; or (3) provide adequate storage space for all stocks in their own facilities.

Advantages Offered by Public Warehouses

On the one hand, warehousemen contend that, in most instances public warehouses can provide, through a more convenient location and the use of more efficient equipment, better service at a lower cost than could be provided by a wholesaler in his privately owned facility. On the other hand, a number of frozen food wholesalers contend that by operating his own warehouse, a wholesaler can integrate the functions of his warehouse and his wholesale plant, thus utilizing labor and equipment more efficiently, and that management, supervision and clerical help can best be integrated in private facilities.

The extent to which a frozen food distributor who is constructing his own plant should plan to use public refrigerated warehouses for long-term storage is dependent on several factors: (1) Availability of economical public storage in the local distribution area; (2) location of the warehouse in relation to the wholesale plant; (3) arrangements made by packers for public warehouse storage space in the local distribution area; (4) availability of storage at packers' warehouses; (5) suitability of intransit storage; and (6) business policies of the wholesaler and his ability to finance the construction of needed facilities.

The information in this article has been extracted from Marketing Research Report No. 18, "Planning a Wholesale Frozen Food Distribution Plant," issued by the Production and Marketing Administration of the United States Department of Agriculture. The latter part of this study, on materials handling in wholesale frozen food distribution plants, will be extracted in a later article.

Warehouse Facilities

In planning for storage in public warehouses, the frozen food wholesaler and his principal supplier should be careful to select warehouses that are strategically located with repect to both the areas of production and distribution. Public warehouses located at in-transit points can be used for assembling mixed carloads of frozen foods. Where foods are stored at in transit points, advantage should always be taken of the "through" freight rate. A packer-distributor who packs vegetables in one section of the country, fruits in another location, and poultry in still another part of the country frequently finds it desirable to assemble stocks of these items in one place for distribution to wholesale outlets. The selection of a centralized storage point by a packer with several outlets eliminates the cross-hauling caused by local shortages and surpluses.

The principal concern of wholesalers using public warehouses for long-term storage are: The charges assessed by the warehouse for storing, handling, and performing other services; the relative ease of obtaining loans on stocks in public storage; and, if his plant is not located in the warehouse, the costs of warehouse-to-plant cartage.

Storage and Handling Charges

Charges for frozen food storage in public warehouses are assessed on the basis of types and quantities of products and types of containers. Additional charges are assessed for handling the products into and out of storage. Charges vary between public warehouses depending on the capital investment in facilities, wage rates, and other factors such as the supply of and demand for space.

Storage charges usually are assessed on a monthly basis, and, since public storage usually incurs a certain fixed cost, rates are much higher per hundredweight for receiving and storing small lots than those for large lots. The following example illustrates the storage charges (excluding handling charges) that a wholesaler might pay on specified lots of frozen vegetables:

TABLE 1—EXAMPLE OF STORAGE CHARGES ON LOTS OF FROZEN VEGETABLES

Quantity received at warehouse	*Monthly storage charges per hundredweight*
Pounds	*Dollars*
Less than 300	0.40
300 to 999	.30
1,000 to 4.999	.23
5,000 to 14,999	.18
15,000 and more	.15

The charges for a storge month begin on the day the products are received at the warehouse. A fraction of a storage month counts as a whole month. It is important, therefore, that wholesalers who use public warehouses for long-term storage have adequate plant facilities so that merchandise may be withdrawn at or near the end of a storage month.

The charges for handling products into and out of a public warehouse are in addition to the storage charges, although some warehouses bill the wholesaler for handling charges and the first month's storage charge as one item. Handling charges cover the unloading and loading of rail cars but do not include similar services for motortrucks. These charges are assessed on a hundredweight basis and usually are scaled in accordance with the storage rates shown in table 2. Breaking of lots for delivery purposes

usually carries an extra delivery service charge. The handling of frozen foods across the warehouse platform from a common carrier to a private truck with warehouse labor and equipment is charged for at a rate which normally is about the same as that of the storage-handling fee.

Other Warehouse Services

Most pubilc refrigerated warehouses are in position to perform from 25 to 30 services for the frozen food wholesaler. However, the services of storage and handling previously discussed are the mainstay of the industry. Some of the most common of the miscellaneous services are: (1) Repacking; (2) reconditioning; (3) weighting; (4) sampling; (5) recoopering; (6) inspecting; (7) advancing cash for express; (8) furnishing dock space for loading and unloading vehicles; (9) special clerical services; (10) reporting inventory; (11) marking containers; and (12) providing delivery notices.

TABLE 2.—PUBLIC REFRIGERATED WAREHOUSE CHARGES FOR HANDLING AND STORING SPECIFIED FROZEN FOODS IN SELECTED CITIES, 1947 [1] (CHARGES BASED ON RATES FOR CARLOAD LOTS)

Frozen food	*Charges per cwt. for handling*	*Monthly charges per cwt. for storage*	*Cost per cwt. of storage for 1 year* [2]
	Dollars	*Dollars*	*Dollars*
Fruits	0.17	0.18	2.33
Vegetables	.17	.18	2.33
Cream	.19	.22	2.83
Eggs	.12	.14	1.80
Poultry	.23	.25	3.23
Meat	.18	.20	2.58

[1] Handling and storage charges per cwt. based on unweighted average of charges made by warehouses in New York, Chicago, Denver and New Orleans.

[2] Computed on basis of only one handling charge and not considering other charges that would occur. The figures are derived by multiplying the monthly storage rate by 12 and adding the cost of handling.

Obtaining Loans

Under normal conditions, frozen food wholesalers or packers usually can obtain loans without difficulty on their products stored in public warehouses. Such loans are usually made by banks with the stipulation that the warehouse will permit the wholesaler or packer to withdraw from storage only that part of the merchandise on which the loan has been repaid. Insurance coverage usually is necessary before money can be borrowed on the merchandise. The insurance is issued at the wholesaler's or packer's expense, and the charges are in addition to other charges normally assessed.

Cartage Costs

One of the principal items of cost that must be borne by the wholesaler who operates in his own facility but who depends on public refrigerated warehouses for a relatively large part of his long-term storage is the carting of products from the warehouse to his plant. The extent to which cartage affects the wholesaler's operating costs depends partly on the volume of business and parly on the distance from the wholesaler's plant to the warehouse. Moreover, a wholesaler with a relatively large volume of business who keeps his delivery trucks and drivers occupied throughout each working day on regular delivery assignments may find that carting frozen foods from warehouse to plant is a sizable expense. A wholesaler with a small operation might find that the normal deliveries to retail stores and restaurants will not keep the drivers fully busy during the week; consequently, only part of his cartage cost may be a direct additional expense, since he is able more fully to utilize motor-trucks and workers.

The elements of cartage costs are: Travel cost to and from the wholesale plant; waiting at the warehouse for products to be delivered to the platform; loading at the warehouse; and unloading at the plant. In this study, costs ranged from 1.4 cents per case for a wholesaler located only a few blocks from the warehouses to 4.7 cents per case for the wholesaler whose plant was 41 to 45 miles from the warehouses used.

Private Storage Facilities

The construction of a wholesale frozen food distribution plant with adaquate storage facilities requires a relatively large capital investment, whereas the rental of space in a public warehouse does not require a large investment. Therefore, a number of wholesalers will continue to depend on public warehouses for long-term storage because they prefer not to invest capital for building their own facilities. A wholesaler attempting to build up his business in a new territory takes less risk by using public warehouse facilities than by constructing his own facilities. In some areas, however, adequate public warehouse space is not available and the wholesaler has no alternative except that of constructing his plant with adequate storage space.

Seasonality of Receipts

The seasonality of storage receipts is an important factor in choosing between public and private storage facilities. If a wholesaler's receipts vary considerably from one season to another, the operation of storage rooms for all his receipts will result in considerable idle space during periods when stocks are low. However, with the advent of the frozen citrus concentrates, which are produced principally during the winter and spring months, the storage cycle for a general line of frozen foods is now fairly steady and results in a high percentage of year-round occupancy.

Because of the difficulties that might arise in obtaining loans on storage stocks in private warehouses, it is suggested that wholesalers who build warehouses for long-term storage include in their articles of incorporation authority to do business as public warehousemen. Such authority will permit a wholesaler serving as a public warehouseman to issue receipts which will usually constitute acceptable collateral to bankers who might be approached for loans on products stored by public depositors or suppliers. In such cases title to the products would remain with the supplier until he sells the product or any portion of it either to the wholesaler or any other customer.

Generally speaking, warehouse receipts representing readily marketable staples which are in the custody of a warehouseman independent of the borrower constitute acceptable collateral. On such collateral bankers may loan as much as 25 per cent of the capital and surplus of the bank to any one depositor. If the operator of the warehouse also stores his own commodities, ordinarily banking laws do not recognize receipts issued on such commodities as acceptable collateral to loans desired by the warehouseman.

Supplies and Space

Of importance in planning private storage facilities is the fact that efficient warehousing requires special know-how concerning the control of supplies and space. Efficient storage operations require: (1) Adequate

Fig. 1—Storage space in a warehouse might be better utilized if small lots of frozen foods and assembled orders awaiting delivery were stacked on racks or shelves. If operation is palletized, racks may be used as shown above. If commodities are hand stacked, several rows of shelves may be used. (McGraw Hill Photo)

space for the volume of merchandise handled; (2) direct accessibility to supplies; (3) efficient utilization of space, manpower, and equipment; and (4) maintenance of an up-to-date inventory.

A wholesaler with a private plant should have, as a minimum, sufficient space to store one month's supply of merchandise. A number of wholesalers find it desirable to provide sufficient space to store at one time as much as one-third of their total annual volume. The wholesaler who has sufficient space for storing one-third of his estimated annual volume of frozen foods can usually receive most of his merchandise directly from packers' warehouses.

Access to Items

Space should be so arranged that ready access can be had to each item stocked. To obtain this accessibility it is often necessary to provide shelves, bins, or racks in the warehouse, as shown in Fig. 1, in which to store slow-moving items handled in small quantities. Such facilities also contribute to the efficient utilization of space.

The most efficient operations are those having the greatest utilization of space commensurate with efficient materials-handling operations. In planning a layout, efficiency in moving merchandise through all three cycles of materials-handling operations should receive primary consideration. These cycles of operations are: (1) Receiving; (2) order assembly; and (3) loading out.

In warehouses where space is a limiting factor and ceilings are relatively low, the stacking of individual packages or cartons rather than palletizing, although increasing handling costs, may prove to be preferable from the viewpoint of space utilization. Hand stacking of packages usually permits greater utilization of space and allows about 75 to 80 per cent of the gross piling space to be used for actual storage. However, if the warehouse is sufficiently large and the volume of the various items handled is sufficiently large, efficiency in handling can be gained in palletizing.

From the viewpoint of handling operations, O F., storage space should preferably be provided in one large room. Rooms having 5,000 to 10,000 square feet of floor space are common in recently constructed warehouses. In addition to being more adaptable to the use of mechanical equipment, large rooms usually have better air circulation and more even temperatures than do small rooms. Products should be stored to permit free air circulation. When stacks are built, several inches of air space should be left between the stacks and the insulated walls, and about 2 feet of space between the top of the stacks and the ceiling, refrigerant coils, or sprinkler pipes. Air circulation underneath the stacks can be provided by storing on 3- or 4-inch dunnage slats or pallets. Slats should run lengthwise in the direction of normal air circulation. Products that are solidly frozen at or below 0 F., can be piled in solid stacks. Products received not solidly frozen should be loosely stacked to allow air circulation, as shown in Fig. 2.

Spacing of Posts

Care should be taken to see that posts in the zero room are spaced so as to allow the merchandise to be moved freely into and out of the stacks. Wide column spacing is preferable where mechanical equipment is to be used. In palletized operations the size of pallets should determine column spacing. Pallets should fit evenly between columns in order to prevent loss of space.

In withdrawing merchandise from storage, honeycombing of the stacks should be avoided in order to con-

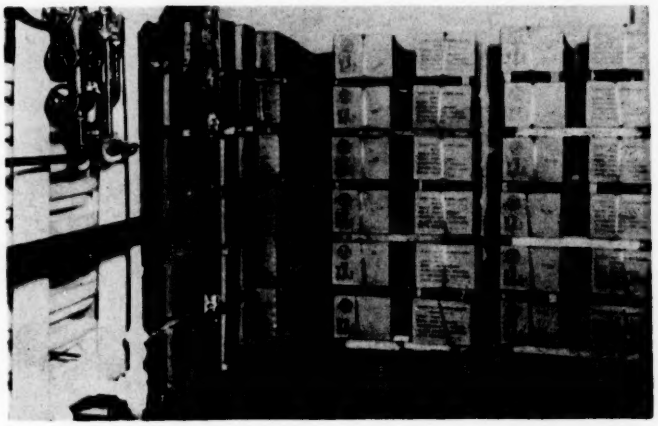


Fig. 2—When frozen foods are received at a warehouse or wholesale plant in a semi-thawed condition they should be stacked loosely until they are solidly frozen. A special low-temperature room with air-blast might be used for that purpose.

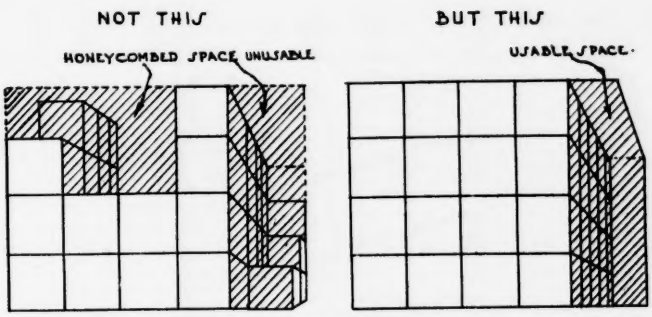


Fig. 3—Where several rows of a single item are stacked together, merchandise should be removed from only one stack at a time in order to maximize the amount of usable storage space.

serve space. Where several rows of the same item are stacked together, withdrawals should be made from one of the stacks until the space it occupies has been completely vacated. Removal of cases from several rows at a time creates unusable vacant space, whereas when a whole row of a commodity is removed, as shown in Fig. 3, the space can be readily used for piling incoming merchandise.

The importance of a simple, efficient, and up-to-date inventory control system cannot be overemphasized. The systems most commonly used are: (1) The "bookkeeping" method; (2) the pegboard system; and (3) the punch-card system. For large-scale operations the punch-card system may be the most efficient. Medium- and small-size operators carrying a relatively small number of items, or wholesalers who sell exclusively by telephone, might find the pegboard system of control to be very satisfactory.

An inventory control should not be devised for the sole purpose of keeping current information on warehouse supplies. One of the principal aims of inventory control is to give management a daily picture of the entire operations — including sales. The mechanics of inventory control methods should tie in closely with the order-taking job of the salesmen and the order-filling job of the warehouse crew.

Temperatures

Storage and order-holding rooms in wholesale frozen food distribution plants, in which part of the cycle of order-assembly operations is performed, are held at or near 0 F. Order-assembly rooms, in which the major portion of this cycle of operations is usually performed, may be held either at or near O F., or between 30 and 40 F. In the industry, the latter are usually referred to as warm rooms. In choosing between zero and warm rooms, the principal factors to be considered are: (1) Effect on product temperature; (2) productivity of labor; and (3) possible utilization of storage and working space.

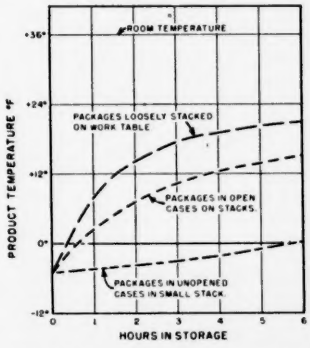


Fig. 4—Average temperature rises of frozen peaches, orange juice concentrate, cauliflower, and peas when removed from storage at -5F. and placed in a room held constantly at 36F. Four thermocouples were used in each of the three situations tested. These were located in packages, stacks, and cases so that the results would indicate a nearly average temperature.

Fig. 5—Individual packages and/or full cases of frozen foods can be packed in insulated shipping containers for delivery to customers.

The principal advantage of zero-room operations is that little if any risk in loss of quality is involved because of possible rises in product temperatures. Reports of laboratory research tests indicated that the effects of temperature rises on product quality vary by products, the amount of temperature rise, and the length of time the product remains at the higher temperature. Concerning the handling of frozen citrus concentrates, the director of research of one corporation, stated: "Loss of temperature and retention for very short periods (1 to 2 days) at, say, 10 to 15 F., does not appreciably injure the product. However, recovery of the temperature is very slow." If the

Fig. 5—Individual packages and/or full cases of frozen foods can be packed in insulated shipping containers for delivery to customers. Frozen foods in these containers can be delivered with products that do not normally require refrigeration. Dry ice is placed in the top of the container unless hauls are of very short duration. These containers should be packed during the order—assembly process.

temperature of the product rises during the order-assembly process in a wholesaler's warm-room operation, and if the product is to be delivered to customers in unrefrigerated trucks and displayed in cabinets at temperatures above zero, deterioration is likely to occur.

Fig. 3 shows the average rises in product temperature wnen removed from a —5 F. storage room and held in unopened cases, opened cases, and loose packages for 6 hours in a room held at a constant temperature of 36 F. Temperature rises were rather rapid for products in individual consumer-size packages placed on work tables in small stacks. Merchandise left in opened cases and packages stacked several deep in bins also showed rapid rises in temperature, but not so rapid as the temperature rises shown in loosely stacked packages on work tables. Full unopened cases in stacks showed very slow rises in product temperature.

Turnover Beneficial

Although this test was conducted over a 6-hour period, it would be unusual for loose packages of merchandise and opened cases to remain in warm order-assembly rooms for that length of time. Even in the least efficient operations care is usually exercised to see that turnover is rather rapid for loose packages and merchandise in opened cases. Wholesalers who operate their order-assembly rooms intermittently during most of the working day should use zero rooms to minimize handling and provide the merchandise with adequate protection.

Since considerable quantities of frozen food can be held in zero order-assembly rooms, less separate storage space will be needed than for warm-room operations. Where public refrigerated warehouses are used, items can be withdrawn from storage in relatively large quantities. Less aisle space is required in zero rooms than that for warm-air chute or warm-room palletized operations.

Insulated shipping containers of the type shown in Fig. 5 are used by some wholesalers for making deliveries of frozen food orders, particularly when the motortrucks are unrefrigerated. Where such containers are used, the order-assembly line must be designed accordingly.

A number of wholesalers will continue to operate in public refrigerated warehouses and other facilities not specifically designed for the wholesale distribution of frozen foods. In improving their order-assembly operations, these wholesalers may find that operations must be planned to fit the facility rather than having the facility designed to fit the operations. Although suggested layouts for order-assemble rooms can be modified in numerous instances to meet limitations imposed by existing facilities without materially sacrificing efficiency, the ideal situation is one in which facilities are constructed "around" the operations.

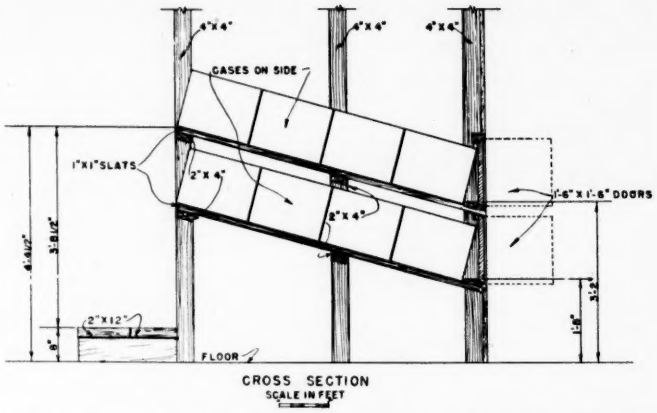


Fig. 6—Layout showing arrangement and size of chutes in warm-room chute operation. The angle of incline of the chutes is 12 degrees and the depth six feet. If gravity conveyors were used in the floor of the chutes rather than wooden slats, angles of incline could be about five degrees and the depth about eight feet.

Use of Chutes

Working stocks of frozen food items may be moved from the storage room to the order-assembly room through refrigerated chutes of the type shown in Fig. 5. Chutes are 2 feet wide, 1½ feet high, and, if constructed with floors of 1- by 2-inch maple wood slats, 6 feet deep. If gravity conveyor sections are used in lieu of wood slats, the chutes may be 8 feet deep. Chutes of 6-foot depth hold 8 to 10 cases, on side. Chutes are arranged one above the other with the lower edges of the doors 20 inches and 38 inches above the floor level. The chutes should slope toward the front with a pitch of 12° for those with wood floors and 5° for those with gravity conveyor floors. With a 12° pitch, the end of an upper 6-foot chute in the storage room would be 4 feet 4½ inches above floor level and would necessitate the use of an 8-inch step in stocking operations.

In wholesale plants where chute installations are used in connection with order-assembly operations, there is some doubt as to whether the palletization of products more than one pallet high in storage is the most efficient method, since it is necessary to feed merchandise to chutes in small quantities. It might be desirable, however, to palletize in the course of unloading and transporting into storage. The breaking down of unit loads at this point means that units are maintained over a relatively short part of the handling job. Moreover, when one worker only must stock chutes with 100 different items, mixed loads must be handled. Where products are not stacked in unit loads in storage, 4-wheel hand platform trucks are generally used in performing the operations involved in chute stocking. From 20 to 30 cases of assorted items can be loaded on one truck. In moving 1,000 cases of frozen foods to the chutes with this type of equipment, about 50 round trips between the stacks and the bins will be necessary and will involve 2,000 separate handlings, or two for each case.

With the exception of the work elements or basic motions involved in removing full cases from the chutes, assembly-line operations are comparable with those previously described for zero-room operations.

The report continues with a discussion of planning in-plant order-assembly operations, work elements involved in filling individual orders and moving orders to holding rooms, methods and facilities for assembling and handling frozen food orders, and selection and use of materials handling equipment.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE NDUSTRIES

Executive Offices
1706 L St. N. W., Washington 6, D. C.

Executive Secretary
Guy W. Jacobs, Washington, D. C.

President
Wm. J. Ayers, Memphis, Tenn.

First Vice-president
Paul H. Andres, Oklahoma City, Okla.

Second Vice-president
E. L. Gunn Jr., Atlanta, Ga.

Treasurer
Geo. Steers, Jr., Kalamazoo, Mich.

THIS MONTH IN BRIEF

Industry leaders who are thoroughly familiar with today's biggest business problems will headline the program of the annual convention of the National Association of Ice Industries to be held in Cincinnati, November 11-14.

An ice exhibit at the annual convention of the American Home Economics Association convention in Atlantic City gave a visual demonstration of how to use ice to enhance the attractiveness of food.

A cooperative exhibit of iced poultry was shown at the Missouri State Fair. A five-foot poultry display case was used for displaying dressed chickens and turkeys in crushed ice.

Again the Ohio Association of Ice Industries had a booth at the Ohio State Fair, showing modern uses of ice.

Reports from the Ohio Agricultural Experiment Station on the advantages of icing sweet corn assert that the research work is paying off. More Ohio people are eating fresh sweet corn than ever before.

Industry Panel To Tackle Problems at Convention

A PANEL of industry leaders who have met and successfully coped with today's biggest problems in the business will offer the benefit of its experience to icemen attending the 1952 National Convention at Cincinnati. The panel will deal with questions submitted in advance as well as with those proffered from the floor at the convention's merchandising session.

Following the precedent set last year at Houston, a full business day will be given over to the merchandising session, to allow airing of as many questions as possible. Paul H. Andres, first vice-president of NAII, will again preside. His leadoff talk at the 1951 merchandising session was a convention highlight.

Spectacular Hall of Mirrors in the Netherland Plaza will house all convention sessions.

A five-page convention bulletin sent out early in September by NAII solicited questions on their individual operations from icemen planning to come to Cincinnati. Members of the merchandising panel, it was announced, will be selected on the basis of the questions received.

A hotel reservation card was also enclosed with the bulletin. Rates for single rooms at the Netherland Plaza, it was indicated, range upward from $4.50; double bedrooms for two begin at $8.50, and twin bedrooms for two can be had for $10.50 and up.

Speaker List Shaping Up

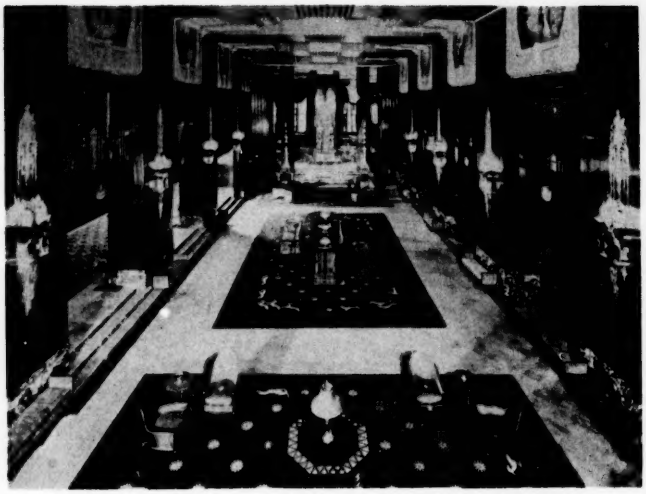
Though not yet complete, the list of convention speakers from both within and outside the ice industry is rapidly taking shape. A well-balanced program of information and authoritative counsel is assured.

Entertainment

Featured by the Thursday evening President's Dinner Dance, the entertainment schedule should be an outstanding one, due to the abundance of places to go and things to do in the Cincinnati area. Locals sources report that professional talent of high caliber is plentiful in the Queen City, and the convention committee plans to take full advantage of this in arranging the banquet program.

High Attendance Likely

As Labor Day passed, the industry in general could look back on one of its most favorable seasons in years.



Convening ice people will stroll this long, impressive lobby at the Netherland Plaza in November.

High temperatures prevalent nationally throughout a good portion of the summer, combined with the development of many new markets.

Exhibitors

With two months remaining before convention, a good representation of exhibitors has already taken booth space. The exhibit space adjoins the convention hall and an interesting array of exhibits is assured. Those registered to date were as follows:

The Lilly Company, Memphis, Tenn.

Union Bag and Paper Corporation, New York, N. Y.

Gifford-Wood Company, Hudson, N. Y.

Index Coupon and Supply Company, La Porte, Ind.

Jos. A. Martocello and Company, Philadelphia, Pa.

Ice Plant Equipment Co., Inc., Philadelphia, Pa.

Ballard Sales Company, Fort Worth, Texas

The Ohio Galvanizing and Mfg. Company, Niles, Ohio.

Bateman Foundry and Machine Company, Inc., Mineral Wells, Texas.

Ice Cooling Appliance Corporation, Morrison, Ill.

Hall Machine Shop, New Smyrna Beach, Fla.

Sam Bonart Uniforms, Inc., New Orleans, La.

York Corporation, York, Pa.

National Rejector, Inc., St. Louis, Mo.

Frick Company, Inc., Waynesboro, Pa.

Vivian Mfg. Co., St. Louis, Mo.

Hamer Mfg. Company, Minneapolis, Minn.

Refrigeration Engineering Corp., Minneapolis, Minn.

Poloron Products, Inc., New Rochelle, N. Y.

Ice Carvings Company, Hollywood, Calif.

Chatfield-Woods Company, Cincinnati, Ohio.

168 Tons of Ice for Corn

AN OHIO corn grower bought and used 168 tons of ice during 31 days in July and August. This grower had never used ice for processing corn, but when he did become interested he made a good start by investing $2,000 in a 100-lb. block ice storage and an ice crusher.

The ice company salesman made four calls. The call in January was brief, with no result. The April call was interesting, and the May call looked good. The June call was the contract call. Grower and ice man united to solve such problems as delivery, storage, crushing, and the securing of a suitable wet strength paper bag for the corn and ice. By July 15, all problems had been solved and an excellent iced corn product was being marketed.

New Merchandising Idea Uses Ice

PROGRESSIVE retail merchants are constantly seeking new, novel merchandising ideas. An Ohio ice company had its salesmen call on a variety of retail store proprietors. Soon the ice company was freezing shoes, blankets, meats, watermelons, and other items in 100-lb blocks of ice for each Saturday morning. This stunt is especially good during the months of June, July and August.

ORANGE JUICE ON ICE. Displays like the above are selling more orange juice and are also helping the iceman sell more ice. The new automatic orange juicer provides an eye-catching center piece for such a display. The appeal of fresh-squeezed orange juice chilled in bottles on sparkling crushed ice is increasing sales in many grocery stores throughout the East.

Fresh Iced Corn is The Best

THE EFFORTS of R. C. Scott and E. K. Alban of the Ohio Agricultural Experiment Station at Ohio State University to sell the iced corn idea to the public are paying off. More Ohio people are eating this delicious cooled corn—and Ohio ice men are selling more ice.

One of the enthusiastic followers of the iced corn technique is Arthur L. Smith who is growing sweet corn on his farm near Columbus, Ohio. The pictures on this page show some of the operations. Many local growers are following Mr. Smith's lead and the result is that more iced sweet corn was available at local markets than ever before.

An illustrated feature article in a recent issue of The Columbus Sunday Dispatch reproduced the pictures on this page and explained how the icing process keeps the sugar-sweet flavor in fresh sweet corn.

So great was the demand for this corn last year that it prompted the local office of one national chain grocery to contract for all fresh corn packed in ice this summer. From all indications, next year will bring even more of the field-fresh sugar-sweet corn to Ohio dining tables.

Surrounded and covered by crushed ice, this sweet corn maintains just-picked freshness.

—Columbus Dispatch photos by Harold Higgins

Picking corn on the Arthur L. Smith farm near Columbus, Ohio. Top left: Corn is hand-picked in the early morning, the truck following pickers through the field. Top Right: Unwieldy ends are cut off after cooled ears of corn are sorted and placed on conveyor belt. Bottom Left: In packing, five dozen ears are alternated in layers with 25 pounds of ice in wet-strength paper bags. Bottom Right: Spraying fresh-picked corn with cool well water takes out the summer heat; cooling is done promptly.

Glamour Ice at Home Economist's Booth

DOING something different this year, the National Association of Ice Industries set up an exhibit at the American Home Economists Convention in Atlantic City. The idea was to show home economists two practical ways of using iceman's ice in everyday life. The display brought excellent results. More than 2,000 home economist visitors stopped to register and admire the cool setting of the display.

Occupying a prominent position in the booth was a table setting. This setting was designed by Mrs. L. C. Kurtz, co-owner of a prominent hotel restaurant supply establishment in Atlantic City, and nationally famous for her table settings. She furnished a variety of dishes and tableware in addition to her flair for the spectacular in table decoration.

TABLE SETTING in ice booth at annual convention of American Home Economics Association at Atlantic City, showing lavish use of ice. Each day the setting was changed. Towle sterling and Lenox china were set for three places. The graceful lines and artfully carved decorations of this exquisite tableware served as a perfect background for the sparkling iced dishes.

Home Economists Stop

On the first day more than 600 home economists stopped and gazed with admiration at the unusual creation of an iced salad centerpiece. The black and white picture reproduced below cannot portray the striking beauty of the colored ice, white pascal celery with bright green tops, the olives, pickles, red radish rosettes, all set in a huge champagne glass. A smaller champagne glass filled with multicolored ice held nested fruit cups. At each place was a dish of tuna salad embedded in sparkling crushed ice. A table cloth of pastel blue, pink napkins, crystal glassware, flowers and greens made for a real crowd stopper.

An adjoining table was prepared as though ready to serve cocktails. Surrounded by glasses was an ice bucket, its scarlet color adding another bright touch. Sparkling clear ice cubes looked like frozen diamonds under the spotlights.

On a grass skirted table a complete picnic scene was laid out. Props included a Progress chest, Triple-Vac ice cream freezer, salad bowl, sandwiches, fruit and Pepsi-Cola buried in ice in the chest.

Other Displays

On other days the following were displayed on the dining table: Shrimp-supreme, served in an oversized snifter glass filled with crushed colored ice, sliced watermelon jutting out from ice in a large champagne glass, and crab salad on fish island.

Many magazine food editors stopped by the booth as did representatives of various newspaper, radio and TV outlets. The exhibit was a worthwhile and very successful enterprise and many valuable contacts were made for the ice industry.

Commenting on this display the current issue of NAII Ice News points out that ideas like those used at this exhibit can be employed by ice companies to gain publicity and boost sales. Here are some of the ways suggested.

Display iced dishes or a picnic setting in your booth at local shows, expositions, or fairs. There are countless possible variations of the above "tricks."

Have photos taken of ice used thus and illustrate your advertisements with them. It will help make your community conscious of your processed ice service.

Furnish such pictures to your local food editor, together with a list of glamour-icing suggestions. Tie in with the tremendous national publicity glamour icing has received this season in such publications as Better Homes and Gardens, McCalls and Woman's Home Companion.

Promote glamour-icing in your sales efforts to clubs, hotels, restaurants and caterers. Show them the fascinating effects it can achieve. Emphasize the fact that the best dining places in the country feature this "luxury touch."

Indiana Ice Company Breaks Into the News

SOME kind of a record for local publicity was set by the Consumers Ice & Fuel Company of New Castle, Indiana, on May 16. That day, says Ice News of The National Association of Ice Industries, crowding aside stories about the steel strike and Korea, a six-column picture layout on the operation of the ice company monopolized the front page of the New Castle Courier-Times.

Complete with bold-face captions, five large pictures depicted interior scenes at the ice company plant. The entire spread occupied 100 column inches directly under the banner head.

Comments H. R. Dailey, owner of Consumers Ice & Fuel, "The old hoss ain't dead yet!"

Ice Sales Show Increase

FROM Dayton, Ohio comes word that ice sales last year were well above the figure for 1920, when ice had a virtual monopoly in the refrigeration field. William H. Adams, general manager of the City Ice & Fuel Co. reports that Dayton sales are running ahead of last year, indicating the industry is headed for another record.

Ice Representative Replies To Newspaper Columnist

RECENTLY a writer in the New York Times took occasion to comment adversely on the status of the ice industry, intimating that its days were gone. To this, Francis X. Timmons, director advertising and publicity, National Association of Ice Industries replied, and his letter was published in a succeeding issue.

Mr. Timmons in his letter said he felt that nostalgic mention of ice under the heading "Topics of The Times," called for a reply from the association. "It is presumed, he continued "that your writer refers to natural ice—which is cut from lakes, streams and ponds. On the other hand, he implies that the ice industry as it existed in the olden days is gone forever. This is not true. He is in error when he states that the ice cream freezer and the ice house are gone with the ice of yesteryear.

"The iceman of today is busier than ever. He supplies ice to commercial, industrial and domestic users on a larger scale than that which was needed twenty-five years ago. True, the ice industry has turned a corner in that the delivery of ice to the home is not the largest segment of its business.

"You will be surprised to learn, however, that owners of mechanical refrigerators are rapidly becoming among the iceman's best customers. People now buy ice regularly for picnics, parties and homemade ice cream. Thousands of ice cream freezers — both electric and hand-crank models — along with picnic chests were sold this summer. Even during winter months processed ice—cubed, crushed and sized—is sold for parties and receptions in the home.

Display Purposes

"Commercially, through the efforts of this association's research department, new uses for ice are being created. Recent developments have improved the quality of fresh vegetables, fresh meat, poultry and fish at the retail level while on display. Ice cuts shrinkage, spoilage, reduces labor and improves appearance of these perishables. In California, for example, 800 meat markets now display fresh meat on ice.

"Hydro-cooling—rapid reduction of field heat through an ice water bath—although not entirely new, has recently been adopted on many farms. Corn icing—reduction of field heat immediately after harvesting to prevent the change of sugars to starch—has proved a boon to corn growers and is enthusiastically endorsed by the Department of Agriculture. Recent store checks have shown that the housewife is willing to pay a few cents more for iced corn because of the excellent quality.

"In the past few years many food editors of newspapers and magazines have extolled the advantages of using ice in the home and for outdoor meals. The picnic chest, for example, used with ice entirely eliminates the danger of spoilage and makes it possible to travel with any kind of edible. It has been of great help to mothers traveling with babies, because it keeps milk properly chilled.

Transportation of Perishables

"Practically all of the 130,000 refrigerator cars now in service employ ice as their cooling agent; no other method as flexible or as economically sound has been found. Ice is primarily used because of its humidifying effect on perishables in addition to its availability.

"There are approximately 100 uses for ice. Some of the lesser known uses are as follows: artificial ice ski jumps, ice carving for banquet decoration, ice punch bowls, various cooling processes involved in the making of munitions, chemicals, alcohol, synthetic rubber, sausage and the mixing of concrete and the shipping of flowers and film. Ice-refrigerated boxes are carrying bottles of whole blood to our combat hospitals in Korea.

"The National Association of Ice Industries intends to continue its research endeavors to better serve the nation's cooling needs. We are all firmly convinced that there will always be an iceman.

FRANCIS X. TIMMONS,
Director Advertising and Publicity,
National Association of Ice Industries.

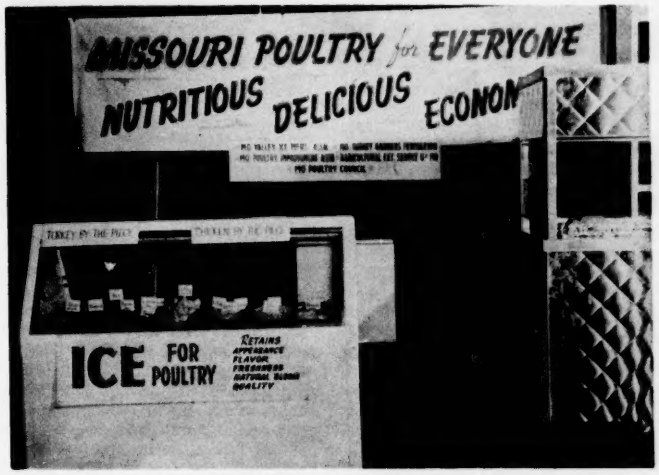
Poultry Icing at Missouri State Fair

A COOPERATIVE exhibit of poultry icing was shown by the Missouri Valley Ice Manufacturers Association, the Missouri Turkey Growers Federation, the Missouri Poultry Improvement Association, the Missouri Poultry Council and the Marketing Extension Service University of Missouri, at the Missouri State Fair, Sedalia, August 16-24, 1952.

This joint endeavor of the ice industry, the poultry industry, and the Extension Service of the University of Missouri was viewed by approximately 200,000 persons during the nine days of the Fair.

A 5 ft. ice poultry display case was used for the displaying of chicken and poultry and turkey by the piece on crushed ice. The idea behind the display—to get the housewives to ask their grocers and butchers to handle cut-up turkey and chicken displayed on ice. The sign on the front of the display case stated the reasons why poultry should be displayed on ice: Retains—Appearance, Flavor, Freshness, Natural Bloom, Quality.

An infra-red cooker, with parts of turkey and chicken cooking, was used to attract attention. 5800 sets of pamphlets containing recipes for the preparation of turkey and chicken, from the Marketing Extension Service of the University of Missouri, were distributed to a large number of interested persons.



This poultry icing exhibit was seen by 200,000 people at the Missouri State Fair, Sedalia, August 16-24.

The Ice Industry

Texas Ice Dock Expands Into Food Store Chain

BACK in 1927, Uncle Johnny Green, operator of a small retail ice dock in Oak Cliff, suburb of Dallas, Tex., decided to stock milk, bread and eggs at his little ice house. It worked. People came, not only to buy ice, but other foodstuffs, and his sales increased accordingly.

Johnny Green's employer approved of the idea and installed other similar food-ice stores until now, it has expanded throughout that section, with 53 outlets in Dallas and 28 in Fort Worth and a number in other cities. Uncle Johnny, long retired, has been pensioned by a grateful employer, and this year these "7-Eleven Stores" celebrate their 25th anniversary.

Thompson Pushed Idea

The man who picked up Johnny Green's creation and pushed it to the top was J. C. Thompson, then a young man just graduated from the University of Texas' School of Business Administration. He believed in the idea, fought for it, and now is president and part owner of the concern.

7-Eleven stores weren't always called by that name. In the beginning they were simple retail ice stations, owned by the Southland Ice Company. The next step was Thompson's adoption of Green's idea of putting food in the twenty ice stations, all in Oak Cliff.

Shortly after this development the stations became known as Tote'm Stores. A totem pole became the symbol. The company supplied the food items and shared the profits with station managers.

It was not until 1945, when the company began its first major advertising program, that the name 7-Eleven was adopted as the official name of all Southland's food stores.

Company officials say the name is more descriptive of one of the stores' outstanding features from the customers' viewpoint—open for business from 7 a.m. to 11 p.m. seven days a week.

It was in Fort Worth, in 1931, that Southland built its first store building designed especially for retailing foods under its plan. Today, the company has spread into Arlington, Austin, Grand Prairie, Houston, Irving, Lamesa, Temple Waco and Weatherford.

In 1927, five years after Thompson joined the company, Southland was sold to a new group of persons. Thompson was one of them, and it wasn't long until he moved into a prominent place in the business' management.

7-Eleven officials boast a number of "firsts," in addition to the drive-in food outlet. They believe they were the first to sell crushed ice in waterproof bags and first to sell United States Grade A eggs in Dallas.

Prager Joins Consumer Credit

THE election of Daniel A. Prager as vice-president has been announced by the National Foundation for Consumer Credit, Washington, D. C. The Foundation is a non-profit organization comprised of leading manufacturers and distributors of durable and semi-durable goods such as television, radio, washing machines, refrigerators, bedding, floor coverings, furniture etc.; prominent retailers; banking and other financial institutions.

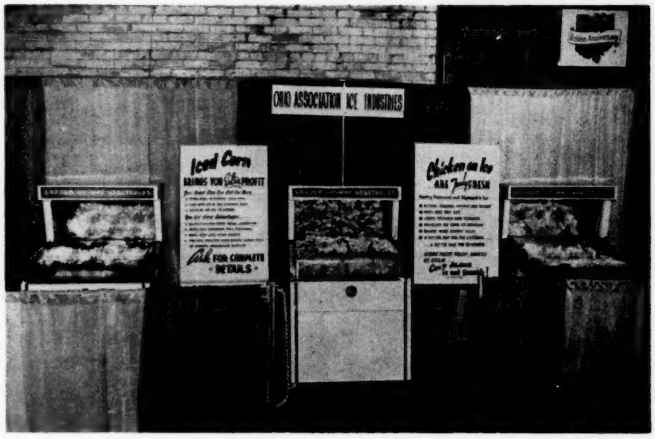
The Foundation's broad objectives are to develop and support an affirmative program for the betterment of consumer credit; sponsor the proper growth of consumer credit in the American way of economic life; achieve wider and better understanding of the use of consumer credit by the public, business, and financing agencies for their mutual benefit. John M. Otter, Vice President of Philco Corporation, is the Foundation's President.

For a number of years, Mr. Prager was Director of the Personnel Training and Marketing Department of the National Association of Ice Industries.

Punch Bowls in the News

AFTER seeing a color postcard which Oscar Mayer Ice Service, Madison, prepared to advertise its punch bowls, home economists on the Chicago Tribune staff asked for a demonstration. George Heath of Oscar Mayer quickly complied, spending an entire afternoon in the Tribune office. Result: A writeup on punch bowls in the Trfbune column "What's New in the Kitchen." The story, which ran on June 20, included a handsome picture of a bowl with roses frozen inside.—NAII Ice News.

Ice Uses Shown at Ohio State Fair



AN ATTRACTIVE display of ice showing its uses for dressed poultry and fresh sweet corn, was presented at the Ohio State Fair at Columbus, August 22-29 by the Ohio Association of Ice Industries. Wm. R. Cunningham of the City Products Corporation, Columbus, a member of the association's Research and Merchandising Committees, had charge.

The layout consisted of a three-foot display case of iced chickens at each end of the booth, with a three-foot display case of sweet corn on ice in the center. Two attractive placards supported by easels told the advantages of using ice for merchandising those items.

There was an unusually large number of visitors at the booth and an increased interest in iced chickens and iced corn was evident from the many inquiries received from farmers, grocers, and housewives. Mr. Cunningham says they learned one thing for certain: The ice industry has shown Mr. Fairgoer that this method is one of practical value.

Reports from Unit Ice Associations

Canadian Association Of Ice Industries

MRS. MILDRED E. CROFT, Secretary

BACK in the Laurentian Hills at the famed Chantecler Resort Hotel, Canadian ice dealers will be gathering soon for the 31st Annual Convention of the Canadian Association of Ice Industries. Already many ice dealers have written the Association Office for room reservations. This is the first year that the Convention will be held away from a city, and these early reservations indicate that the choice of The Chantecler will be popular with members.

On Monday, October 20, there will be a directors' luncheon and meeting at 12:00 noon; at 2:30 p. m. a bridge and tea for the directors' and delegates' ladies. The "Get-Together Party" will be at 8:30 p. m. The functions arranged for Tuesday, October 21 are: business session in the morning; a scenic tour through the Laurentian mountains in the afternoon; and the President's Party in the evening. Two business sessions are planned for Wednesday, one morning and one afternoon. A ladies' committee has been appointed to arrange outings and various types of entertainment, and, because of fame and outstanding facilities of The Chantecler, a large turnout of lady delegates is anticipated.

The Retail Merchants Association Annual Convention and Food Show will be held at the Royal York Hotel September 29-30, and the ice industry has been invited to present its story at this gathering of over 1,200 food merchants. John J. McGoey of Kitchener will handle this assignment for the Canadian Association of Ice Industries and has been given one hour on the program to demonstrate the various uses of ice in the retail food market. It is likely that Mr. McGoey will utilize the newer motion pictures featuring iced displays and will also promote the ice industry's new "Meat-an Ice" merchandising method. This talk will provide invaluable publicity for ice dealers, and at the same time provide the food store operators with the kind of information they could not get in any other way.

The Canadian Ice Foundation's advertisement in the August issue of the Canadian Grocer features Meat-On-Ice, and calls the food store operators attention to the profits possible in this type of meat merchandising. This publication goes to 6,700 retail food store operators throughout Canada, and should not only pick up inquiries from these merchants to local ice dealers, but should be the signal for ice dealers to canvass their local trade and sell this profitable ice service. This advertisement is the last of a summer-long campaign in the Canadian Grocer promoting iced displays—for vegetables, meat, poultry, fish. And, it is not only this paid advertising that is acquainting the meat and produce trades with the possibilities of ice service, but many food trade journals have run articles during the past few months on this type of merchandising. Ice dealers can cash in with a strong follow up.

There was a record turnout at the Canadian Association of Ice Industries' Golf Tournament held this year at the beautiful Cutten Fields Golf Course in Guelph, in July. A perfect course, and a perfect day for golf, which was followed by an excellent turkey dinner. The Blue Top Trophy was up for competition again as well as a dozen other fine prizes. For the third time, the trophy for low net went to J. E. McPherson of St. Catharines.

Illinois Association Of Ice Industries

W. D. WRIGHT, Secretary

THE ice business in Illinois has been good, particularly in the crushed and processed ice department and it has taxed the resources of the ice men to keep up with the demand. In many instances processed ice sales have accounted for the larger part of gross tonnage and generally, it is moving at a satisfactory price. I heard the statement made on the radio this morning that this would be the 36th day since June 1 that the temperature reached over 90 degrees. Everything has suffered more or less from drouth and at this date there is no rain promised.

The biggest headache in the ice industry has been to obtain sufficient labor, and that which is available is lacking in quality. Defense projects, huge building programs, road construction and the armed services have drained away the labor supply. And the wages being paid in most instances, by these activities is so high, the iceman and other service organizations cannot compete. It is really a serious situation.

With respect to the hydrocooling of sweet corn and peaches, Mr. Hartline, Market Development Section, Illinois Department of Agriculture, has the following in a recent bulletin: "The West Frankfort sweet corn project is just about completed except for some planting for fall harvest. The quality of the sweet corn was not up to expectations but the price has been outstanding due to the drought in other parts of the Midwest. Up to August 1, sales had been at $2.75 to $3.00 per bag or five dozen ears with most of the sales at the $3.00 price. Their only regret is that they had such a small acreage since the demand was so great. The ice industry reports that there has been a considerable tonnage of ice used on sweet corn icing at Beardstown. While this did not come under our project, it was a direct result of our work in 1951 and was sponsored by the local ice company.

"A visit was made to the Clarksville, Arkansas Farmers Exchange to observe their Stericooler in operation. They have two machines which they manufactured themselves at a cost of approximately $6,000 each. Each machine has a capacity of four hundred bushels or a carload per hour. They are stericooling practically all their own output and also doing custom work at 20 cents per bushel. The manager, Lloyd Yarborgh, states that while they usually receive enough additional premium to pay the cost of stericooling they have not always been able to do so.

"However, they feel that it is money well spent since it has put their fruit in such a condition that they have had no rejections at destination. He states that the trade is becoming more receptive to this process and in some cases, demanding it. Some benefits that he has observed that have not been previously mentioned are as follows: It restores peaches which are slightly shriveled to a presentable condition by tightening the skin. Slight scratches or skin breaks are now being passed by the inspectors because brown rot has not developed in them.

"We have been forced to cancel our project in Southern Illinois this year because of the drought. The grower who had planned to install this equipment did not feel that he could afford this investment in view of the fact that the peaches might not measure up in either quality or quantity. The manufacturer of the equipment concurred in this opinion. We regret very much that this cancellation was necessary because considerable interest had been shown by all who were involved."

The Ice Industry

Florida Ice Association Annual Meeting

AN INTERESTING and worthwhile annual convention is being planned by the Florida Ice Association to be held at the Hotel Floridian, Tampa, Fla. October 12-14. The registration desk for the convention will open Sunday afternoon at 3:00 o'clock and on Monday at 8:30 a. m. The same registration fee will be established as last year.

Tampa ice manufacturers and their ladies will be hosts at the Get Acquainted Party to be held on the mezzanine floor of the hotel starting at 6:00 p. m. Exhibits will be set up on the Mezzanine floor of the hotel and in the meeting hall. These exhibits will provide an interesting display of the modern trends in the manufacture of ice and ice appliances.

The first business session will start Monday at 9:30 a. m. The program Committee promises that in three streamlined sessions the major problems with which the ice industry is faced will be thoroughly discussed and analyzed.

Dr. A. P. Black, head of the chemistry department University of Florida, will discuss the treatment of water for ice making. Dr. Black has won international fame on this subject, and he will have a very interesting message.

Theo Hamilton, Jacksonville attorney, one of the authors of the Fair Labor amendment to the Florida Constitution will give some pertinent facts on labor relations.

S. C. Clark, manager of the Atlantic Company in Jacksonville will serve as moderator at a round table discussion, designed to promote the exchange of questions and answers. Such subjects as dealer relations, truck icing, processed ice profits, competing with small ice makers, vendors, value of training programs and meat on ice will be of interest to all Florida ice men.

At the final session Wednesday morning C. P. Austin, director of the Research Department of the National Association of Ice Industries will tell about starting new markets for ice and just why the future of the ice industry can be profitable.

Mr. Stallings, past president of the Florida Association of Insurance Agents will give a talk on how safety pays in lower insurance rates.

United States Senator George Smathers of Florida will give the closing address.

Indiana Association of Ice Industries

THE Indiana Association of Ice Industries again cooperated with growers of the state in their exhibits at the Horticultural Building at the Indiana State Fair at Indianapolis. The Indianapolis Vegetable Growers Association, the Terre Haute Vegetable Growers Association, and the DeKalb County Vegetable Growers Association, all protected their vegetable displays with ice. The DeKalb County Growers had a specialized booth featuring iced sweet corn.

In addition to the vegetable displays Purdue University featured a "Chicken of Tomorrow" exhibit in the Horticultural Building. Dressed chickens entered by some 120 participants of 4-H Clubs were on display on ice throughout the Fair.

Joe Vandemark of Purdue University recently gave WFBM-TV of Indianapolis viewers a first hand look at local field iced sweet corn. Corn was frozen in a 300-pound block of ice, and made a striking picture for the television audience. Stressing the importance of ice protection, it is expected that this publicity will do much to spur the sales of iced sweet corn.

The State of Indiana has announced that for the year beginning July 1, 1952 insurance rates will be reduced approximately 2¼ percent. Based on estimated payrolls for the coming year, the total savings will amount to about $500,000. Last year insurance rates were increased on an average of 6.4 percent. That increase resulted from action by the 1951 state legislature substantially increasing benefits for injured or disabled employees under the Workmen's Compensation and Occupational Diseases laws. The 1951 legislature increased benefits approximately 9.4 percent. This latest decrease in rates is a reflection of excellent safety records, good administration and cooperation between employees, employers, the Division of Labor, the State Industrial Board and the Insurance Commissioner.

Old Ice Bill Paid

THE Meyer Coal Company Leavenworth, Kans. received a $25.00 check recently in payment of an ice bill thirty years overdue, with a note attached asking the company to please send a receipt. The check came from Harry C. Wing, St. Clair Shores, Mich. The charge was for delivery of 5,000 pounds of ice over a three-month period in 1922. The note also said, "Thanks for waiting."

Self-Policing May Extend To Government Regulations

AT a private meeting held in Washington, an order of the Economic Stabilization Agency was discussed under which companies so desiring could self police compliance with price, wage and salary regulations in return for certain tax allowances in case of violations.

Reportedly, the plan works like this: An individual company or an industry can apply to ESA to police itself. Companies would make voluntary audits and report any inadvertent violations to ESA. In return for this self reporting, any fines imposed for the violation would be tax deductible. Fines for violations discovered by enforcement authorities are not deductible. A glaring inequity in this arrangement at present is that the tax allowance does not apply in cases where a self audit fails to reveal an existing violation later discovered by enforcement authorities. An effort is being made to have the plan changed to cover all "good faith" cases

Florida Meat Dealer Wins Meat-On-Ice Award

A MEAT dealer in Miami Springs, Fla. recently won an award offered by Meat Merchandising for the best display of fresh meat on ice. The dealer is "Sarge" O'Neill, an alert merchandiser and an enthusiastic booster for Meat-On-Ice, and he has been displaying fresh meat on ice in his modern meat market for some time, with greatly increased sales and gratifying acceptance by his customers.

Mr. O'Neill who appeared on the program of the recent sales clinic of the Florida Ice Association won a $25 award for a picture of the display plus a wall certificate. The ice industry greatly appreciates this cooperation and support of this wide-awake meat retailer.

City Products Announces New Vendor With Leaflets

WHEN the City Products Corporation, St. Louis, installs an ice vending station in a new area it makes no secret of the event. Bright red and yellow leaflets are circulated throughout the neighborhood served by the vendor, announcing the new convenience. The circulars, 6x9½ inches, give the machine's location, the forms of ice it dispenses and the telephone number of the company. When a vendor is placed in one of the wealthier residential neighborhoods, the announcement is distributed on attractive blotters instead of the leaflets.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

NEWS

OPERATING

MAINTENANCE

QUESTIONS -- ANSWERS

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EXECUTIVE OFFICE
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THIS MONTH

A cordial invitation is extended by the Dallas Chapter to all NAPRE members to attend the 43d annual convention at Dallas, November 12 - 14. A splendid program of both business sessions and entertainment is in the making.

A new NAPRE Sec., J. Richard Kelahan, has been appointed to succeed the late Emerson Brandt.

An interesting paper on important new Freon developments was presented by D. J. Merrill at a meeting of the New Orleans Chapter.

Dallas Rolls Out Welcome Mat For NAPRE Convention

TOM WEATHERFORD, president of Dallas Chapter extends a most cordial invitation to all members to attend the 43rd annual convention of NAPRE in their city on November 12, 13 and 14, at the Adolphus Hotel. Feverish correspondence has been flowing between A. R. Carlson, president, H. G. Venemann, the national office staff and the Texas committeemen Warren Cunningham, D. F. Bancook and L. P. Reiss. Secretary-Treasurer Riek of Dallas Chapter has also figured very prominently in the convention arrangements.

Professor H. G. Venemann, pinch-hitting during his summer vacation from the university as coordinator of convention activities, has completed most of the arrangements for the national office. He writes as follows from Avenal, Calif.,:

"The tentative program of the NAPRE Convention was published in the September issue of ICE AND REFRIGERATION. The speakers are specialists in their fields and have messages that will appeal to all operating engineers, regardless of whether they are working in air conditioning, cold storages, ice plants, food freezers, refineries, breweries or what not.

Preview of Program

"Elliott Hallowell of Dallas, a member of our Board of Directors will conduct a tour through the famous Alford Refrigerated Warehouses, the largest in the world. This is the plant which has caused much discussion and some controversy among engineers because of its many unique features of construction. Since he was responsible for its design, Mr. Hallowell wants every engineer to visit this plant and see for themselves how everything is panning out. Mr. Hallowell will also give a paper which will help us select the air conditioning system best suited for particular jobs.

"Chief Engineer of Refrigeration Engineering Inc., D. D. Wile, Los Angeles, is doing splendid work in both the ASRE and NAPRE. His paper on "Blower Coil Design and Selection to Obtain Proper Humidity Control" is especially appropriate and should clarify a topic which is greatly misunderstood by most operating men. When accepting this assignment, Mr. Wile stated that one of his most gratifying experiences was a talk given to members of the NAPRE at a Los Angeles Chapter meeting. His talk had been so enthusiastically received by the operating men that he was thrilled and eager for a repeat performance.

"To complete the session on air conditioning, F. Ed Ince of the Marlo Coil Co., St. Louis, will explain the methods of testing blower type coils and how to use rating tables. This should prove valuable to engineers when selecting coils or when checking the capactiy of coils already in operation.

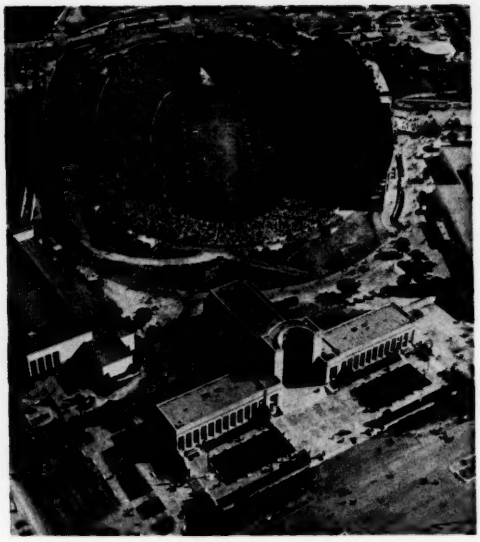
"The Bureau of Refrigeration Information session on Wednesday evening under the leadership of Leo Vivien of New Orleans will afford an opportunity for the members to obtain answers on any puzzling problems they may have.

"The Thursday morning session will be devoted to problems involved in the freezing of foods. Joe Cross, chief engineer of Mojonnier Bros., Chicago, will give us the results of recent experiences in concentration of food products. Regis Gubser, Los Angeles, Chairman of the Board of Directors, will discuss the various factors which influence the selection of freezing facilities. Mr. Gubser has had a world of valuable experience as chief engineer with California Consumers Corp.

"John Daly, Los Angeles Manager for Ice Plants of the Sante Fe Railway System, will tell us about a new design evaporator for low temperature work. Mr. Daly will be remembered for his excellent paper on a mechanical refrigeration system for railway service presented at the national convention in Los Angeles.

"At the Thursday afternoon session we will be favored with two papers on Cold Storages, followed by the inspection of the Alford Refrigerated Warehouses. Howard Peterson of Yakima,

ON TO DALLAS! Those members flying to NAPRE Convention may personally see this scene. Others motoring may use a portion of this New Central Expressway.



No, This isn't where NAPRE will hold its convention, but Dallas' Cotton Bowl Football draws the biggest crowds in the Southwest. Photograph shows Cotton Bowl's location just behind the Hall of State on the State Fair Grounds.

National Membership Chairman and retired president, will give a summation on design features of modern cold storage plants. In the light of the ever increasing use of frozen food facilities, this paper should be very appropriate at this time.

"Professor Harold P. Hayes, Dean of Engineering at the California State Polytechnic College, San Louis Obispo, and Joseph Sullivan, Engineer for Modern Ice and Cold Storage Co., San Jose, have prepared a comprehensive paper on good maintenance and operating procedure in cold storage plants. This promises to be of exceptional interest.

Diversified Session

"Friday morning's session is quite diversified, covering refrigeration as applied to refineries, railways and breweries. The Magnolia Oil Co., Dallas, will provide a speaker who will discuss the many services that refrigeration renders to the petroleum industry and how the refineries reciprocate by serving the refrigeration industry. C. O. Buttrill, Assistant Process Superintendent of the Magnolia Petroleum Refinery, Beaumont, Texas is to be this speaker.

"LeRoy Etzel, General Superintendent of Refrigeration, Pacific Fruit Express Co., San Francisco, a faithful worker in the NAPRE for many years will present a paper "Refrigeration On The Rails." No one is more competent than he to tell this story.

"George B. Bright or Robert Doremus of Detroit will speak on Modern Brewery Practice. They have not decided which of these eminent engineers will give this paper, but both are superbly qualified, since both have been modeling and remodeling breweries for many years and both have been ardent workers in the N.A.P.R.E. since Hector was a pup. It would be a toss up as to which would give the better address.

"Friday afternoon's session is centered on remodeling. Messrs. Reiss and Rytlewski will remodel the plants and Venemann the operating engineers. L. P. Reiss, member of the National Educational Committee will give personal experiences with changes in ice plant evaporators which resulted in increased efficiencies and capacities.

"Eugene Rytlewski, Chicago, member, Board of Directors, will discuss the revamping of ice plants to automatic operation.

Entertainment

"In addition to the serious business of the convention, the Dallas Chapter promises delightful entertainment for both ladies and gentlemen. The NAPRE will be hosts to a group of Texas engineers who will hold their Fall conference one day prior to the opening of our conventioin and who will stay over to attend our sessions. We extend to them a hearty welcome."

N A P R E
Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Calculating Tonnage of Brine Cooler

Question No. 931: Is there a better formula for calculating the tonnage of a brine cooler using calcium chloride brine than the one shown below? —E. M.

$$\text{Tons capacity} = \frac{\text{Gallons brine pumped} \times \text{TD} \times 8}{288000}$$

ANSWER: The formula given is accurate only when the specific gravity of the brine is 1.2 and its specific heat is 0.8. The same accuracy can be obtained by using a simpler formula:

$$\text{Tons capacity} = \frac{\text{gal. per min} \times \text{T.D.} \times 8}{200}$$

This can be further simplified by the formula

Tons capacity =

$$\frac{\text{gal. per min.} \times \text{T.D.}}{25}$$

To be accurate one should use the following formula:

Tons capacity =

$$\frac{\text{g.p.m.} \times 8\frac{1}{3} \times \text{sp. gr.} \times \text{T.D.} \times \text{sp. ht.}}{200}$$

The 8 in the original equation is obtained by multiplying 8⅓ x 1.2 x 0.8 where 1.2 is the specific gravity and 0.8 is the specific heat of the brine. When 288000 is used the quantity of brine must be given in gallons per 24 hours. Since brine pump capacities are usually given in gal. per min. I prefer the simpler equation which uses 200 Btu. per min.

BTU Loss

Question No. 932: What is the difference in Btu loss per 24 hours between two shell and tube brine coolers, Nos. 1 and 2?

Cooler No. 1, 42 inches diam., 14 feet long, horizontal, full flooded, ammonia, suction pressure, 5 inch vacuum; inlet brine—23 F, outlet—26 F; room temperature 80 F; shell insulated with 3 inches hair felt, heads insulated with 3 inches cork board.

Cooler No. 2, 48 inches diam., 18 feet long, horizontal, full flooded ammonia, all temperatures same as in No. 1. Shell and head insulated with 8 inches cork board.—F. K.

ANSWER: I estimate the heat loss on the brine cooler insulated with 8 inches of corkboard to be about 17,600 Btu. per 24 hours, and on the cooler insulated with 3 inches of materials to be about 47,600 Btu. per 24 hours. In making my computations I used the following values:

Area of heads 20 sq. ft.

Area of shell 154 sq. ft.

U value for 3 inch hair felt or cork 0.1 Btu. per sq. ft. degree F hour.

U value for 8 inches corkboard .037 Btu. per sq. ft. degree F. hour.

Temperature difference between air and ammonia, 114 degrees F.

Suction Pressures

Question No. 933: When operating on two suction pressures, O psig and 15 psig, is it better to use two compressors than one multiple effect compressor?—M. S.

ANSWER: This will depend upon the load to be carried at each suction pressure. In some cases a multiple effect compressor will carry both loads very nicely and in other cases it will not balance out at 0 and 15 psig. The displacement of the compressor is determined by the load to be carried at the lowest suction pressure, which at 0 psig is of the order of 12 c.f.m. per ton. The amount of ammonia which may enter the compressor from the 15 psig evaporators will necessarily depend upon the displacement of the compressor, and the amount which has entered from the low pressure coils. If the load at 0 psig is about 37.5 percent of the total load, a multiple effect compressor will handle the other 62.5 percent at 15 psig. This is the only combination that will balance out at the two suction pressures specified.

New Questions

Ice Making Water Ratio

Question No. 934: In water consumption in a modern ice plant, what portion or percentage of the water consumed is used in ice manufacturing, that is, the product itself; what percentage of consumption goes to sanitation, that is, can washing etc.; and what percentage goes to loss and/or use in cooling, that is, cooling towers, evaporative condensers or water cooled condensers?—H.E.McE

Milk Tank Insulation

Question No. 935: Two new milk storage tanks are to be installed in the dairy plant in which I am operating. Space in the room selected is not adequate and it has been decided to knock out the wall between the room and a covered loading platform. After the tanks have been installed the wall will be restored. The contractor insists on installing a band of 2 inches of corkboard insulation on the circumference of the tank between the tank and the new brick work in the walls. The tank manufacturer installed 1½ inches of insulation at the time of manufacture between the inside stainless steel liner and the exterior painted metal shell. Why does the manufacturer insist on the additional insulation?—J.R.K.

Ice Cream Hardening By Tunnel Freezing

Question No. 936: I have been asked to convert a tunnel freezer to ice cream hardening. This will be a continuous chain conveyor. The packages will be size 5½ inches long 3½ inches wide 1½ inches thick, next 4 inches long 3 inches wide 2¼ inches thick; next round cup 3¾ diameter top, 3 inch diameter bottom, 2 inches deep; next round cup 2¾ diameter top, 2¼ diameter bottom, 2 inches deep. The ice cream will enter at 22 deg. F and is required to be hard enough for market when it comes out of tunnel. The tunnel temperature will be —30F and will have air velocity of 1,000 ft. per min. Please advise me how many minutes the packages must stay in the tunnel to harden and if the temperature is reduced to — 40F with 1,500 feet air velocity what will be the difference in freezing time?—T.McG

Kelahan New Technical Editor and Sec'y. N.A.P.R.E.

THE appointment of J. Richard Kelahan as technical editor of ICE AND REFRIGERATION and secretary of the National Association of Practical Refrigerating Engineers has been announced by H. T. McDermott, publisher of ICE AND REFRIGERATION and A. R. Carlson, president of N.A.P.R.E. He assumed the duties of Emerson Brandt whose death occurred last January.

J. Richard Kelahan

Mr. Kelahan received his technical training at Washington University, St. Louis, Mo., supplemented with courses in engineering at the U. S. Merchant Marine Academy, where he was commissioned a Lieutenant USNR and USMS; U. S. Navy schools, and University of California Extension. He had active service in the Merchant Marine and the Navy from 1938 to 1946. He was an associate instructor in naval science and tactics at the U. S. Merchant Marine Academy in 1944-1945. He holds licenses as steam and diesel engineer.

More recently he served as sales engineer for Cork Insulation Co. and Mundet Cork Co. Corp. While living in San Francisco he joined California Chapter No. 1 N.A.P.R.E. and was corresponding secretary for that Chapter.

Mr. Kelahan assumed his new duties September 1.

News Notes And Chapter Activities

Los Angeles

FRED HERR

PROFESSOR H. G. Venemann, Professor of Refrigeration, Purdue University and Chairman of the NAPRE Educational Committee, was honored by a gathering of representatives of Los Angeles, Colton and San Francisco Chapters of the NAPRE, at the Jonathon Club, Los Angeles, on the night of August 28. The professor, as guest speaker, related his experiences in connection with the 1952 Operating Data Book. He also reported that all technical paper presentations for the Dallas Convention had been arranged, and that advance indications point to a highly successful convention in Texas.

Professor Venemann spent two days in the Los Angeles area following a visit to his son-in-law and daughter, Mr. and Mrs. Lyle of Avenal. He had his first experience with a California earthquake which occurred while he was in a cafeteria in Avenal. Professor Venemann apparently was not greatly impressed by the vigor of California tremblors, for he described his experience to Emmett Quinn of Los Angeles somewhat as follows: "A few glasses rattled in the restaurant, several bottles on a shelf clicked together, and the earthquake was over." However, it wasn't quite as mild as that elsewhere, for the cities of Bakersfield and Tehachepi, only a hundred or so miles south of Avenual suffered some $25,000,000 in damage from the quakes.

Another guest of the evening was H. C. Diehl, Colorado Springs, Colo., Director of the Refrigeration Research Foundation. Mr. Diehl was introduced as "Dutch", the nickname which his legion of friends from New York to San Francisco apply to him more frequently than his given name. Mr. Diehl gave a resume of the types of experiments and research which the Refrigeration Research Foundation has underway at present in connection with cold storage warehouse problems. While the time at his disposal compelled him to generalize to some extent, he offered some pertinent and interesting facts dealing with humidity and temperature control of perishable products during warehousing, and on the use of cold storage facilities to prevent batteries from deteriorating.

Another guest at the Jonathon Club was Harry Bowe of the Los Angeles Board of Education, who has collaborated closely with Los Angeles NAPRE in furthering the establishment of the Jesse Blair Memorial Laboratory and Library for Refrigeration Education at the Frank Wiggins Trade School, a unit of the Los Angeles school system.

Present from Los Angeles Chapter were: President Edgar Marrs, Secretary Donald Byl, Vice President George Paulick, Treasurer Emmett Quinn, National Director Regis Gubser, who is chairman of the Los Angeles Chapter Educational Committee; Membership Chairman, W. R. Burnett, Frank Eccleston, H. G. Mansfield, Elmer Johnson director of the Los Angeles section, ASRE, L. G. Schroeder, representing Colton Chapter, and National Director Leroy Etzel of San Francisco Chapter.

Los Angeles Chapter inauguarted the fall activity with a ham and beans dinner on the night of September 17. Ed Nelson's entertainment committee catered to the physical demands of the membership with an appropriately succulent and aromatic luncheon of ham hocks and baked beans and served the cultural demands of those same members with musical, vocal and film entertainment.

Los Angeles area refrigeration, air conditioning, heating and power engineers, and students in those fields have an opportunity to take advantage of four night school courses offered by the Extension Division of the University of California at Los Angeles, all of which began in mid-September. These classes are not competing with, nor withdraw attendance from, the NAPRE preliminary class in refrigeration which Los Angeles Chapter sponsors from 7 to 8 p.m. on the first and second Wednesday of each month from October through June.

The University night courses include the following: "Electrical Power for Industrial Plants," which is held for 18 consecutive Mondays from 7 to 9:30 p.m. Theodore F. Gautschi, electrical engineer attached to the U. S. Naval Ordnance Test Station of Southern California, is the instructor. The course deals with the application of engineering principles in the design of industrial power systems.

"Practical Air Conditioning" is the title of an 18 session course, with Howard N. Helfman, contract engineer of the Air Conditioning Company, Inc., Los Angeles, as instructor. This is described as a practical course in air conditioning, including discussion and application of estimating heating and cooling loads, psychrometrics, refrigeration machines, blowers, pumps, boilers, furnaces sheet metal duct design, air distribution, control devices and sequences, and noise and vibration. This class opened on September 18 and is held each Thursday from 7 to 9:30 p.m. for 18 weeks.

A class in "Heat Transfer and Thermodynamics" began September 24. Session nights are Wednesday of each week from 7 to 9:30 o'clock. George F. Ainsman, mechanical engineer with the Hughes Aircraft Company is the instructor.

W. F. Gabor, plant engineer of the Flintkote Company, Los Angeles directs a night class in "Pumping Machinery and Applications." The class meets every Tuesday from 7 to 9.30 p.m. for 18 weeks. Hydraulic theory applied to pumping problems, piping layouts, analysis of construction, features and application of centrifugal, rotary, steam, power and vacuum pumps, and their installation, operation and maintenance, are covered in the course.

Colton

H. O. BONTER

OUR MEETING on August 13 was held at the Exchange Orange Products Co. plant at Ontario, Calif. The tour through the plant was very interesting. The plant covers two city blocks, is two stories high with a large modern refrigerating plant for processing and freezing the orange juice. The output for a year is about 250 thousand tons of fruit and the maximum per day is about 250 tons. Normally around 500 people are employed, and at peak periods this figure jumps to 900. Sixty per cent of the product is sold for domestic use and the remaining 40 per cent is used for export to other countries.

After the products such as oils, pecton, etc., have been extracted from the fruit, the orange peel and pulp and what salvage cannot be used for cattle food is used for fertilizer. The exchange has a 250 acre farm on which they use the fertilizer. Industrial alcohol is also extracted from the oranges and in 1950 they made 1½ million pounds of pecton. They are the largest pecton plant in the world. This is a non-profit organization and the revenue received from the sale of the products is distributed with the growers.

E. J. Pollack, assistant manager, outlined what we would see before the tour. He was assisted by Carl Hooker and other engineers who acted as guides.

Memphis

CHARLES CONLEY

CHARLES CONLEY reports from Memphis that the chapter's Annual Round-Up and Watermelon Party was held in the air conditioned auditorium of the Memphis Cold Storage warehouse on Wednesday, August 20. There were 57 members and guests in attendance. It was a real watermelon night, the temperature was high and the humidity was soaking wet. Doug Smith went home with a big grin on his face for the melons were what he said they would be after having been cooled down to a temperature of 35 degrees F.

Virgil Cox, through the cooperation of James Gilbreath, sales engineer of ESSO Standard Oil Co., showed a very fine talking colored motion picture of the state of New York and another titled "Island Oddities." These pictures are Standard Oil Company's travelog pictures. They were educational as well as entertaining.

In a short talk, A. J. Clay, the chapter instructor, told of the educational work that the chapter is doing. The educational work was resumed full scale on the first Wednesday in September. Although the chapter did not recess for the summer months, due to the very hot weather the attendance wasn't what it should be. With the advent of cooler weather our meetings have been better attended and as the fall program really gets under way we expect full scale attendance.

At this first educational meeting in September, H. L. Todd continued his lecture on the Guy King course. The lesson covered heat exchangers, oil separators and purgers. He used the

blackboard to illustrate his talk and showed various pieces of equipment in sketch form and illustrated the working principles. It was an excellent presentation.

Chicago

WM. TIFFIN

CHICAGO Chapter has a new slate of officers as follows:

President, Bert McKenna
First Vice President, Douglas Benton
Second Vice President, Frank Bartilotta
Secretary, William Tiffin
Treasurer, A. O. Clementson
Sergeant-at-Arms, Harold Michler

The board members are Ed Garnaas, Leslie Clifford and Eugene Rytlewski.

After the summer recess the chapter started the fall program with a meeting on Tuesday, September 16 at the Engineers Club. The instruction course was continued with Gene Rytlewski as instructor.

Our new president, Bert McKenna announced that the first meeting in October would be held at Central Cold Storage Co., and would be a social affair with plenty of refreshments.

San Francisco

FRANK CORDOZA

SAN FRANCISCO opened its fall session on September 10 after the summer recess. Don Bryant, instructor from San Francisco City College continued Guy King's course on Basic Refrigeration. The chapter on compressors was the starting point.

The featured speaker of the evening was George Armerding of Mojonner Bros., who spoke on Low Temperature Evaporators.

The President, Walter Sandholt, announced the resignation of Dick Kelahan as corresponding secretary in order to take the position as National Secreary of NAPRE. A telegram was read by the President from Dick thanking San Francisco Chapter for the farewell party and the rawhide briefcase which was presented to him.

New Orleans

LEO VIVIEN

THE members of Louisiana Chapter No. 2 upon reporting for membership meeting held on July 23 in the ever comfortable air conditioned Jackson Room in the St. Charles Hotel, were very agreeably treated with a "meet-the-eye-appeal" Dupont-Kinetic "Road Show"—so indicated and identified in Dupont's Advertising Division.

The "Road Show" is a magnificent display, some fifty odd parts in its construction of aluminum metals, and professionally draped in light blue color of heavy drapery materials, complete with "still" film, the projector operated remotely, controlled from the lecturer's lectern. The film showed distinctly clear, making the lecture truly enjoyable, and, of course, very enlightening to the members present.

Naturally, DuPont-Kinetic's Lecturer, D. "Jim" Merrill, out of Houston, Texas, was the feature attraction, for he contributed to the completeness of the Du-Pont-Kinetic "Road Show." His very educational subject—"Freon—Its Development, Properties and Applications." Our lecturer went on to tell about the need of safe refrigerants, and how "Freon" was developed as a result. There was discussed their properties, as well as telling about their uses.

Demonstrations were then given, and answers to many questions concerning "Freon" refrigerants, from the members assembled, were very ably given by Mr. Merrill.

Another fine lecture was presented to the chapter by Mr. Hilbert, Engineer for the Standard Brass Co., on Design of Pumps and Cooling Towers and their operating problems. Mr. Hilbert covered this subject very well and was beseiged with questions at the completion of his talk. Many problems peculiar to our particular climate were explained.

Frank Chase, our Educational Chairman, continues to obtain fine lectures, and at the August 22 meeting. Al Lusch of the Reilly-Benton Co. delivered a talk on Insulation and its application. Mr. Lusch covered all phases of insulation problems and various types of insulating materials. The interest of the members was manifested by the number of questions from the floor.

Membership Chairman D. Fischer is getting our members enthused about the membership contest, and promises that Louisiana Chapter No. 2 will be trying till the gong sounds.

(NOTE: The full text of Mr. Vivien's report is featured on another page of this issue.)

NAPRE Department

St. Louis

S. S. TATALOVICH

St. Louis Chapter has elected new officers. The slate is as follows:

President, Charles Wunderlich.
Vice President, Eugene Kessler.
Secretary, Stanley S. Tatalovich.
Treasurer, E. W. Acey.
Sergeant-at-Arms, Lester Lanser.
Directors: Eugene Bishop, John D. McCarthy and John D. Dobbs.

Now that the fall season is getting under way we are looking forward to renewed activity and interest in the chapter meetings.

Don't Forget
NAPRE Convention
Dallas, Texas
November 12-14

Membership Contest in the Stretch

WE ARE NEARING THE FINISH! The membership contest for the Emerson Brandt Memorial Award closes October 15. The summer lull has passed. We must leave no stone unturned to reach our goal for 1952. Much has been accomplished but the punch hasn't been delivered yet.

Howard Peterson, our Junior Past President and Membership Chairman, reports that Los Angeles has shown excellent results. New Orleans, now that they have completed an exceptional drive for Operating Data Book Advertising, has geared up for the big push on new members. Memphis has done great. This is to mention only a few of the pace setters. And don't forget to watch Seattle, Tacoma and Yakima. Chapters are on their own now—may the best one win!

This year will see a permanent cup known as the Emerson Brandt Memorial Membership Trophy awarded to the chapter achieving the greatest possible accomplishment in membership building. The trophy will be suitably engraved and will revolve annually to the winner of the membership contest. Each chapter that is named as winner shall have its name and year of the contest inscribed thereon. The Membership Committee with the approval of the officers and board of directors shall set up the rules and judge the contest each year, as in the past.

Howard Peterson has announced that in addition to the trophy a diploma-like parchment award will be presented to each chapter winning in their classification. This will be a permanent award which can be framed and hung in the chapter meeting room for all members and guests to see. It will be an award of merit that any chapter will be proud to possess.

The membership committee announces the following chapter competition:

Detroit vs San Francisco
Colton vs Stockton-Modesto
Fresno vs Tacoma
St. Louis vs Pittsburgh
Dallas vs Chicago
Memphis vs Seattle
San Jose vs Minnesota
Yakima vs Tulsavs Rio Grande
Yakima vs Tulsa vs Rio Grande Valley
Los Angeles vs New Orleans

NAPRE Department

All members-at-large are urged to get their prospective new members signed on the dotted line immediately. Without your help this drive cannot succeed. In your classification are the brightest spots for the development of new chapters. Furthermore, you represent the universal coverage of NAPRE—the entire United States and 14 foreign countries.

Chairman Peterson urges further: "This is the final prod from your membership committee. Each chapter President, Secretary and membership chairman is urged to do his utmost in the remaining four weeks. Each individual member must assume his responsibility. Our Association is a personal thing. It cannot grow if each of you do not contribute your part. It cannot give to you, if you have not first given. We aid one another. There are many outside NAPRE who need and want the benefits we have to offer. And besides that, there is genuine satisfaction in getting members into your group.

"Personally, I want to take this opportunity to thank each of you for your wonderful support. I only hope our combined forces have produced a harvest the results of which we'll all be proud.

"But don't forget there's still time to accomplish much. Thanks a million".

The Chemical Development of Freon As a Refrigerant

From a report of LEO J. VIVIEN of New Orleans on a lecture given by D. J. MERRILL, sales engineer for Dupont-Kenetic.

Mr. "Jim" Merrill's lecture began about a group of products which few people have seen, which can be considered to be among the more important discoveries of the twentieth century, and there is no question they have added much to our high standard of living. The products are the "Freon" flourinated hydrocarbon refrigerants. But the remarkable compounds are not only refrigerants, they are being used also as propellants in aerosol products and as intermediates for chemical manufacture.

ALTHOUGH mechanical refrigeration goes way back into the nineteenth century, there was no safe, effective refrigerant until 1931; that is, a material that acted efficiently under pressure and heat, but still could be used in mechanical equipment without food contamination and injury to human beings in case of a leak.

There was a quote from the Journal of the American Medical Association, giving an idea of what was happening at the time. In 1929 there was reported a group of 20 cases in which poisoning occurred as the result of a leaking refrigerating system in Chicago apartment houses. Ten of these patients died. After numerous accidents, deaths and injuries that came from maintainence or use of refrigeration equipment, the medical profession recommended regulation of all refrigeration and air conditioning equipment and that Federal, State and Local health agencies should exercise effective control of all refrigerants.

It was obvious that this industry, which was really in its infancy, needed to find a safe refrigerant if it were to fulfill its promise for growth.

Around 1928, Dr. Thomas Midgely, Jr., working with a group of chemists, engineers, physicists and toxicologists set out to find the ideal refrigerant. They agreed that it must have all of these properties:

Characteristics of Ideal Refrigerant

The ideal refrigerant must be (1) nonexplosive; (2) be nontoxic; (3) be noninflammable; (4) be practical from a mechanical standpoint; (5) be noncorrosive; (6) be nonirritating; (7) have suitable boiling point; (8) be practically odorless; (9) be noninjurious to foods, flowers, furs and fabrics.

This refrigerant was to be a planned development, produced by a deliberate "tailoring" of chemicals.

Dr. Midgely, who developed the "Freon" refrigerants, was a mechanical engineer from Cornell University. Since he has other outstanding chemical discoveries to his credit, such as tetraethyl lead, used as the antiknock compound in modern gasolines, there is a favorite saying the Dupont "family" uses, to the effect that Dr. Midgely was probably to greatest chemist that ever graduated with a degree of mechanical engineering.

In 1930 Dr. Midgely announced to the scientific world his discoveries about fluorinated hydrocarbons. These were later trademarked "Freon" refrigerants. They are now produced and sold by Kinetic Chemicals Division of the DuPont Company.

The research, development and manufacture of "Freon" was a big undertaking, one which could only be done by a large organization with suitable personnel and finances to do the job.

Stimulated by the availability of "Freon" refrigerants in 1931, new and improved refrigerating equipment for home and industry began to emerge from the drawing board. This equipment was safer, more compact, more efficient. It required less maintenance, yet lasted longer. What was a 100 million dollar industry in 1930 has grown to over a two-billion dollar one today, and "Freon" refrigerants certainly played a major part in it. Equipment designed for "Freon" is built by every manufacturer of refrigerating machinery in the country.

Composition of Freon

Everything on this world—you, myself, the clothes we wear, the air we breathe is made up of one or more basic substances called elements. Altogether there are 90 of them.

When two or more elements are joined together, they form what we call a compound. One of the more commonly known compounds is water, made up of the elements hydrogen and oxygen. Another is salt—which is composed of the elements sodium and chlorine. With this brief background Mr. Merrill discussed the basic chemistry of the "Freon" refrigerants. They are composed of four elements—carbon, hydrogen, chlorine and fluorine. Chemists believe that elements are held together by electrical forces. To make it easier to understand, suppose we imagine that each element has hands to hold on to the other elements, i.e., (1) Carbon—has four hands, (2) Hydrogen, Chlorine and Fluorine each have one hand. Now Methane is composed of one Carbon and four Hydrogens. Methane has a boiling point of -259F. It is both flammable and explosive.

If you take Methane, and substitute one Chlorine for a Hydrogen, you have a compound called Methyl Chloride. Methyl Chloride has a boiling point of -11F, and is both flammable and toxic.

Replacing another Hydrogen with a Chlorine, develops a compound called Methylene Chloride. It has a boiling point of 104F. It is noninflammable, and relatively nontoxic.

By replacing still another Hydrogen with a Clorine, you get Chloroform. It boils at 142F, and although noninflammable it is toxic.

When all the Hydrogens have been replaced with Chlorines, you have Carbon Tetrachloride, which is toxic but noninflammable. This, as you know, is used as a fire extinguishing agent. Its boiling point is 169F. This is the starting point of some "Freon" refrigerants. But by replacing some of the Chlorines with Fluorines compounds are made that are not only noninflammable, but also nontoxic and noncorrosive. Furthermore they have boiling points suitable for use in refrigerating and air conditioning equipment. This is done by replacing one Chlorine with one Fluorine. This Compound is known as "Freon-11". Its chemical name is a jay-breaker—Trichloromonofluoromethance.

Freon Safety

Like all "Freon" refrigerants, "Froen-11" is noninflammable, nontoxic, noncorrosive, and is safe under normal conditions of use. It has a boiling point of 75F. By replacing another Chlorine with a Fluorine is gotten "Freon-12". It as a boiling point of -22F.

Replacing a third Chlorine with a Fluorine you have "Freon-13". This refrigerant has a boiling point of approximately -115F. When the last and fourth Chlorine is replaced with a Fluorine, you have "Freon-14". This has a boiling point of approximately -198F.

You will note that every time we replace a Chlorine with a Fluorine that the boiling point of the compound is lowered approximately 95F., but more important—the compound is noninflammable and noncombustible. The compound is stable and nontoxic, or of a very low order of toxicity. The compound is odorless when mixed with air. The compound is noncorrosive. In short, the compound is safe under all normal conditions. Other "Freon" refrigerants can be made by combining the elements in various ways.

In addition to "Freon-11" and "Freon-12" other commercial refrigerants are —"Freon-21". This is made up of one Carbon, two Chlorines, one Fluorine and one Hydrogen. It has a boiling point of 48F. The next is "Freon-22", and has a boiling point of -44F. Another is "Freon-113". It has two Carbons, and its boiling point is 118F. It is a derivitive of Ethane, not Methane. The sixth "Freon" refrigerant is "Freon-114". It also has two Carbons, and has a boiling point of 38F.

These six refrigerants, whose boiling points extend over a wide range of temperatures meet the needs of all the refrigeration and air conditioning equipment built today. Actually there are 207 possible Compounds in the Methane and Ethane series, made of Carbon, Fluorine, Chlorine and Hydrogen. Most of these have been made in the laboratories of the DuPont Company, but only those that meet the rigid requirements for a "Freon" ever get into commercial production.

Refrigerants for Types

Mr. Merrill went on to state, that the members of NAPRE work with a wide variety of equipment, that you will want to know the right refrigerant for each type of equipment, its operating characteristics and its advantages. There are three types of compressors used widely today. They are the centrifugal type, the reciprocating or radial type and the rotary type.

"Freon-11", as you will recall, has a boiling point of plus 75F. It is used mainly for centrifugal compressors of 50 tons capacity and over, where medium temperatures are required. They are used in hospitals, theatres, department stores, small office buildings, factories and the like.

"Freon-12" is the most widely used refrigerant. Its boiling point is -22F. It can be used in all three types of compressors. "Freon-12" installations will be found cooling hotels, office buildings, factories, providing refrigeration for locker plants, frozen food cabinets, household refrigerators, water coolers, industrial process control, and many other uses.

"Freon-21", the third member of the "Freon" family has a boiling point of plus 48F. It is adaptable to both centrifugal and rotary type compressors, and has also been used in absorption type systems. You will find "Freon-21" used in cooling medium sized buildings.

"Freon-22", which is gaining wider accepance in the industry, boils about 20F lower than "Freon-12". Its boiling point is -44F. "Freon-22" is primarily a lower temperature refrigerant, used in reciprocating compressors. It is particularly suitable for temperature ranges from -25F to -75F, and even lower, although it is used in comfort cooling too. Typical examples of uses are—low temperature industrial process work, altitude chambers for testing aircraft parts, farm and home freezers, and package type air conditioning units. It can be used in ice cream cabinets and the like, as well as a wide variety of other installations.

The fifth member of the family is "Freon-113". You will remember that it has a boiling point of plus 118F. It is especially recommended for centrifugal type compressors of 25 tons capacity and over.

"Freon-114", the sixth of the commercially available "Freon" refrigerants, you may recall has a boiling point of plus 38F. It is adaptable to all three types of compressors.

Operating Characteristics

Let's turn now from applications to learning something about the operating characteristics of these refrigerants. Since you are called upon to solve refrigeration problems, this is handy information to have. First, "Freon" refrigerants are noncorrosive. They have no effect on metals, including many alloys of aluminum, or materials commonly used in refrigeration and air conditioning equipment, at operating temperatures. There is one exception as far as corrosion is concerned—magnesium. It is not recommended for use in "Freon" systems, neither is aluminum containing more than two percent magnesium. This is mainly because of the small amounts of water always present in systems, as you know. It does not come from "Freon". The designer of the equipment has a wide range of metals and materials, and he can build his equipment with confidence.

"Freon" refrigerants tend to dissolve natural rubber binders where they are used in making packings and gaskets. However, certain synthetic rubber, such as Neoprene are entirely suitable. When buying gaskets, packings, etc., for refrigeration equipment the supplier of the gasket or packing should know what "Freon" refrigerant will be used, because the solvent properties of each refrigerant vary. This one reason why it is not wise to change from one refrigerant to another without considering the effects on different parts of the system. Certain ingredients of synthetic rubber can be varied by the

gasket manufacturer to meet the needs of the "Freon" refrigerant used.

Proper lubrication of refrigeration machinery is important. There are certain facts about "Freon" and oil with which you should be familar, since again, all the "Freon" refrigerants do not act the same. For example, both "Freon-11" and "Freon-12" mix completely with mineral lubricating oil under all conditions. But the same is not true with "Freon-22". It will mix with mineral lubricating oil in the high temperature side of the system, but will separate in the low temperature side, forming two layers with the oil on top. The separation depends upon: (a) the type of oil, (b) the percentage of oil in the liquid "Freon-22", and (c) the temperature.

The same is true of "Freon-114". Manufacturers, in designing systems for these refrigerants, take this into account. If the oil in the low side is a problem and an oil separator is not already provided, one can be installed between the compressor and condenser, as close to the cylinder head as possible.

Equipment manufacturers usually recommend the proper oil to use with their equipment. Their recommendations should be followed. Oils suitable for use with "Freon" systems: (a) Should be of straight run and properly refined mineral oil; (b) Should not contain water, sediment, acid, soap, resin or any substance other than petroleum.

Moisture

Mr. Merrill stated, that the members present would feel that he was overlooking something if he did not say more about moisture in refrigeration systems—particularly in "Freon" systems; but whether "Freon" is used or not, a refrigeration system should be dry. Some of the most troublesome problems can be caused by moisture. Even very small quantities of water will cause corrosion, or may form ice crystals which can clog the expansion valve or capillary tube, and stop the system. In addition, moisture contaminates the lubricating oil and may result in poor lubrication with excessive wear and shorter life.

Anti-freezes are frequently used to combat moisture. DuPont does not recommend their use. To date more than 200 different anti-freezes have been tested in the DuPont laboratories, and not one has been found suitable. They all have some bad properties when used in refrigeration systems.

If you are having any moisture troubles, we recommend that you get rid of the moisture—get it out of the system. The ideal way to remove water is to drain out the refrigerant and oil — evacuate — dry — and then carefully recharge, with a new supply of dry lubricating oil and refrigerant. Again the equipment manufacturers' recommendations should be followed carefully. In addition, it is wise to install a dehydrator and strainer containing a drying agent as insurance, in case you have been unable to do as good a drying job in the field as can be done in the factory. These cartridges should be large enough for they can only hold so much water, and they should be located according to the manufacturers' instructions. They should also use a drying agent suitable for use with "Freon" refrigerants, such as silica gel, activated alumina or calcium sulfate.

While he was talking about operating characteristics, the speaker made a few comments about "Freon-22". "Freon-22" should not be substituted for "Freon-12" unless the equipment manufacturer says so. "Freon-22" operates at higher pressures than "Freon-12" and may cause trouble with machines that have lighter parts and smaller bearings than those normally used for "Freon-22".

Other Factors

Other factors must be considered when designing a system for "Freon-22". Motors must be large enough to take care of the additional load caused by the higher pressures. Pully sizes and belt speeds must be checked. Some controls and valves are not interchangeable, so these must be chosen for the conditions under which "Freon-22" is used. Furthermore, the entire system must be balanced as far as sizes of condenser, evaporator and other pieces are concerned. Another very important difference between "Freon-22" and "Freon-12" is that "Freon-22" dissolves about 40 times as much water at 0F, as "Freon-12". At —45F., it holds 100 times as much. Because of this ability to hold more water, very few, if any, "Freon-22" systems have had trouble with ice formation at the expansion device. Remember that it is the free water that causes trouble, and not that dissolved in the refrigerant. However, you should still take the same precautions to keep a "Freon-22" system as dry as you would with "Freon-12", to hold down oil contamination, corrosion and extra wear.

Mr. Merrill stated that something should be said about the cost of "Freon", because the selection of a refrigerant must be based upon overall utility, rather than cost alone. For example, in a mechanical household refrigerator, the refrigerant costs about as much as a package of cigarettes, or one of the hinges on the door.

Operating Qualities

This would be a good time to summarize the operating qualities of "Freon" refrigerants. Along with low refrigerant cost, "Freon" is safe under all normal conditions. It permits simple construction, quiet operation, and lightweight compact compressors. "Freon" gives operating efficiencies and is adaptable to all types of compressors from the small units in household refrigerators to large industrial or commercial units of several thousand horsepower.

Don't Forget NAPRE Convention Dallas, Texas November 12-14

The lecturer stated, in closing, a few words about two trends in the industry—one toward higher condensing temperatures, and the other toward lower refrigerant temperatures—that his firm has a definite responsibility in the refrigeration and air conditioning industry, and when there is sufficient demand in the very low temperature field, they will make safe, efficient refrigerants available, such as "Freon-13" and "Freon-14" which are intended specifically for very low temperature use. "Freon-22", a low temperature refrigerant, has been sold for some years.

Then there is the opposite trend he mentioned, and that is the need for refrigerants of high stability for higher condensing temperatures. You are probably asking, "Why?". There are two main reasons — A shortage of water in some locations, and inadequate sewer facilities, even in those cities with ample water supply. For these reasons refrigeration equipment in the future will use air instead of water for condensing. This will require more stable refrigerants. "Freon" compounds have been made in the laboratory for such applications, but they are not yet available commercially.

ENGINE ROOM POINTERS –

Pointer on Buying Spot-Welded Products

THIS writer has had and is still having so much trouble with spot-welded products that he is now asking for a guarantee that the spot welds will hold for at least ten years. Ten years isn't too long. Riveted work will hold longer than that, usually. In fact riveted work is considerably more trustworthy.

True, some spot welds do hold very well, but the writer has learned of no way in which to determine, at the time of purchase, how substantial a spot weld is. Thus last week the writer was informed by his wife that the handle on one of the ice trays in the refrigerator "came off". It was spot welded. Upon complaining to the dealer she was told to buy a new tray. The dealer said that a new tray would cost less than having the old one fixed. The new tray will cost $3.50. It has not been received as yet.

Then a few days later a shelf in a steel kitchen cabinet fell down. It was spot-welded. The wife pasted it back in place with "iron cement." Only the Lord knows how long the cement will hold it there as cement, really, isn't as good as spot-welding.—W.F.S.

Centrifugal Clutch Must be Keyed

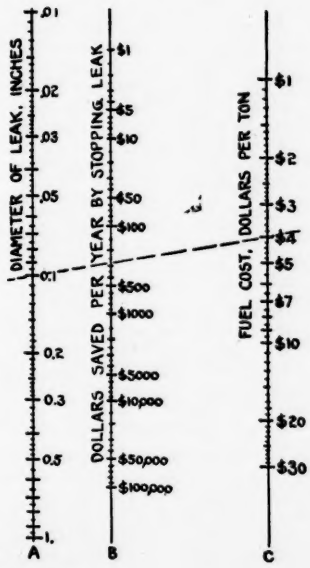
AS every reader doubtless knows, a centrifugal clutch must be fastened both to the driving end and to the driven end. When the driver arrives at a definite speed, the clutch "takes hold", due to centrifugal force.

Talk to a centrifugal clutch salesman and he will doubtless tell you some amusing tales. Thus for example a clutch salesman was called by a chief engineer, no less, because, as stated by the chief over the telephone, "The clutch won't pull the load." The salesman hurried to the plant, and, sure enough, the chief was right. The salesman was puzzled for quite a while because he had selected the clutch for the engineer himself — a clutch having 100 percent excess capacity. He found that he could easily turn the driven machine by "hand", yet the clutch wouldn't move it. Finally he noticed that the clutch wasn't keyed to the driven shaft. Momentarily the salesman's face was red for not having noticed the missing key instantly. The chief's face, of course, was a very deep red. The accompanying sketch shows the clutch as situated between the motor and the driven machine.

In another instance the buyer of a lawn mower called up the dealer who had just delivered it and said, "There is something wrong with the lawn mower. The motor slips a lot." The dealer thought he had better go himself and "have a look" as it was the first complaint of the kind he had received. But nothing was wrong. The motor "slipped", yes, but only when it was starting and getting up to speed due to the intermediate friction clutch. Clutches of this kind are a "good thing."—W.F.S.

Estimating Savings From Steam Leaks

ESTIMATE the size of the opening through which the steam is leaking and find the corresponding figure in column A. From that point run a straight line over to the cost of fuel per ton in column C. The intersection of that straight line with column B gives the annual cost of the leak in dollars.



Thus for example the dotted line drawn across this chart tells you that if the diameter of the leak is one-tenth of an inch, and if your fuel costs $4 per ton, the annual saving by stopping the leak will amount to about $280.

If you have several leaks, find the saving by applying the chart to each leak individually and add the savings together. Thus if there are five leaks and column B says $10, $50, $100, $500, and $1000 respectively, the total saving per year will amount to $1660.

Pipe Thread Must Taper

IN HIS younger days this writer was a so-called "Professor of Machine Shop". At least, he was in charge of the college shops and the pupils respectfully called him "Professor" although he knows now that he had much to learn—and still has.

An outstanding embarrassing occurrence came to pass when the college engineer in charge of heating the buildings came in with a 12-inch pipe and asked whether the writer could thread it in a lathe. The engineer said he had nothing in his tool room large enough for threading a 12-inch pipe.

"Sure," this writer assured him, and he proceeded to turn the job over to a student who was good at cutting threads.

The student tackled the job with vim and vigor, as good students usually do, and his professor watched and instructed. In a short time the job was finished and the engineer was notified to "come and get it."

Upon looking at the finished job the engineer was pleased. "It looks better than a die cut job", he said, and he thanked everybody profusely.

A few days later the engineer came in and informed the writer that although the job looked good he had had considerable trouble with it because the joint leaked. He had a hard time stopping the leak.

Why did it leak? Because the professor had failed to tell the student to use the lathe's taper attachment and give the thread the taper that a die would have given it. The thread was cut entirely without taper—like the thread of a bolt.—W.F.S.

ASRE Announces Annual Meeting Nov. 30-Dec. 3

A joint meeting with the American Society of Mechanical Engineers and Symposiums on commercial and industrial coil defrosting, insulation, room air conditioners also product planning and styling of domestic refrigerators, form the high lights of the 48th Annual Meeting of the American Society of Refrigerating Engineers, according to an announcemet by George K. Iwashita, Program Committee Chairman. New York City.

In addition, there will be an entire session devoted to a round table discussion of the various methods of automobile air conditioning that are now being used by several prominent manufacturers.

An innovation in ASRE meetings, introduced at the meeting last June in Atlanta, an exhibit of technical research processes employed in the refrigeration industry, will be continued at this session. These exhibits, strictly non-commercial in character, will display several very interesting developments in research indicating the trend in the development of refrigeration equipment and processes.

One entire session will be devoted to papers and a discussion of food processing led by well known authorities in the field of refrigerated foods.

For the benefit of those particularly interested in the application of refrigeration equipment, papers are now being considered by the Program Committee on refrigeration in the textile, rubber and brewery industries.

Joint Meeting ASME

The joint meeting with ASME, the winter meeting of which will be held in New York the same week, will take place Monday afternoon, December 1 at the Commodore Hotel and will be presided over jointly by Dr. R. C. Jordan, vice-president, ASRE and E. L. Knoedler, chairman, Process Industry Division, ASME. Papers of interest to members of both Societies will be presented. Among the subjects being considered are: Turbo-Expanders for Low Temperature Refrigeratin and Combined Heat Transfer and Vapor Diffusion.

One session that promises to be of unusual interest to refrigerating engineers is the symposium on Commercial and Industrial Defrosting. Five prominent refrigeration engineers will each present a discussion of one or more methods of defrosting, including: water, air, hot gas, electrical, hand gas, and infra-red. These talks will be followed by a free-for-all discussion with Clifford F. Holske, past president of ASRE, acting as moderator.

Domestic Conference

The Domestic Refrigerator Engineering Conference, always a popular feature at ASRE conventions, this year promises a most unusual and interesting program requiring an all day session, the first half of which will incdude talks by prominent engineers discussing what the future holds for the industry followed by a round table discussion in the afternoon on Industrial Design—its history, functions, and relationship of "Consultant" to "Company" industrial designers. This discussion will be participated in by a number of company and consulting designers under the leadership of the well known industrial designer, Walter Dorwin Teague.

Plans for the Insulation and Air Conditioner Conferences are rapidly being completed and will be announced in the near future.

The usual entertainment features for members and their ladies are being scheduled including an inspection trip of the much heralded liner the United States if her sailing dates will permit.

ASHVE to Hold 59th Meeting in Chicago

THE American Society of Heating and Ventilating Engineers will hold its 59th annual meeting in Chicago, January 26 to 29, 1953, at the Conrad Hilton Hotel. The 11th International Heating, Ventilating and Air Conditioning Exposition will be held in conjunction with the meeting which is expected to be the largest in the history of the society.

The Exposition will take place at the International Amphitheatre on Chicago's south side. This will be the largest heating, ventilating and air conditioning exposition ever held, with over 300 exhibitors participating. The society will have space in the show and will feature several of its current research projects.

The society's Illinois Chapter will serve as hosts for the meeting and the committee on arrangements will be under the direction of W. A. Kuechenberg, general chairman. According to Professor E. R. Queer, chairman of the program and papers committee, the technical sessions will preseent a large number of excellent engineering and research papers including several from the society's Research Laboratory and cooperating institutions.

C. W. Bornquist is vice-chairman of the Committee on Arrangements. The honorary chairmen are H. M. Hart, S. R. Lewis, A. C. Willard. M. W. Bishop is president of the Chicago Chapter and G. V. Zintal is secretary.

Large Refrigeration Plant In Operation at Antwerp

A NEWLY completed refrigeration plant, claimed to be the most important in Europe, has been put into operation at the port of Antwerp, Belgium. The plant is owned and operated by the Administration of Refrigerated Facilities of the Belgian Government, known as REFRIBEL.

Three temperature levels are provided: 60,000 square meters of space are held at —14 C. for the storage of frozen meats, fruits, vegetables, and butter; 10,000 square meters of space are kept at 0 C. for the preservation of apples, pears, and eggs; and the remaining 10,000 square meters are held at -20 C. for the rapid freezing of meats, fruits, and vegetables.

The operating capacity of the rapid freezing rooms is expected to reach 600 metric tons of meat a week. Excellent handling facilities permit loading and unloading of refrigerated cargoes and their transfer to or from warehouses at the rate of 5,000 metric tons per 24-hour period.

This new refrigeration plant will have a beneficial effect on Belgian agriculture in that it permits the preservation of large quantities of Belgian produce and may thereby increase exports of these products. The completed storage facilities will enhance Antwerp as a transit port.

Federal Inspection No Protection from Spoilage

A STATE or federal condition certificate covering perishables in storage is of limited value as evidence of proper care, according to a recent decision of the Supreme Court of the State of Washington. The case on which the ruling was made involved a refrigerated warehouseman whose customer had charged that a consignment of onions became rotten and unmerchantable while in the warehouseman's care.

Despite the fact that the warehouse had been granted a satisfactory federal inspection certificate covering the product in question, the court ruled that the warehouseman must stand the loss which his customer claimed.

Commenting on the decision, the defendant declares: "(under the ruling) if a warehouseman secures a certificate showing only 10 per cent decay in late April, a farmer who has suffered market reverses can say that in January when he wanted to market the onions they were rotten and unmarketable. Therefore, the warehouseman will have to stand the loss. The precedent is established and undoubtedly will be used in future suits.

Booth Fisheries Expands Shrimp Production

THE production of shrimp to keep up with the increasing demand is being expanded by Booth Fsiheries Corp. according to R. P. Fletcher, Jr., president. Terming shrimp as the favorite American fish dish, Mr. Fletcher said that the recent acquisition of General Seafood de Mexico, since changed to Booth Fisheries de Mexico, will help the company maintain a continuous source of supply and get closer to the shrimp beds off the Yucatan peninsula. The purchase gave the company a freezing plant in Campeche, Mexico, 17 trawlers and a refrigerated transport vessel.

Shrimping operations off the Yucatan coast are subjected to adverse weather conditions which curtail production along the United States coast in the winter months and are much closer to land, Fletcher explained.

The new subsidiary will enable the Chicago company to round out its supply of frozen shrimp in periods of relative scarcity. In addition, the company is currently making plans to tap the huge shrimp resources of the Caribbean and the north coast of South America.

In Brownsville, Texas, Booth Fisheries operates a plant employing 135 persons in the production of breaded shrimp. Twice in 12 months Booth has expanded packing facilities and further expansion of this plant is contemplated in the near future.

Growth of all Booth's freezing facilities throughout its entire operations north as far as Petit de Grat and as far south as Booth Fisheries de Mexico, has helped make the firm the world's largest shrimp seller.

In a recent 12 month period, Booth moved near 15,000,000 lbs. of frozen shrimp by refrigerated trucks. Shrimp is now sent to every major market in the United States.

CONVENTION CALENDAR

FLORIDA ICE ASSOCIATION
October 12-14, 1952
Hotel Floridan, Tampa, Fla.
MURIEL WASHBURN, Secretary

CANADIAN ASSOCIATION OF ICE INDUSTRIES
October 21-22, 1952
Chantecler Hotel, Ste. Adele, Que.
MILDRED CROFT, Secretary

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 11-14, 1952
Netherland Plaza Hotel, Cincinnati
GUY W. JACOBS, Exec.-secy.

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 12-14, 1952
Adolphus Hotel, Dallas, Tex.
J. RICHARD KELAHAN, Secretary

DELTA STATES ICE ASSOCIATION
November 23-25, 1952
Hotel Heidelberg, Jackson, Miss.
R. N. MILLING, Secretary

MISSOURI VALLEY ICE MANUFACTURERS' ASSOCIATION
January 12-13, 1953
Hotel President, Kansas City, Mo.
V. R. ESPHORST, Secy.-treas.

GEORGIA ICE MANUFACTURERS ASSOCIATION
February 24-25, 1953
Ansley Hotel, Atlanta, Ga.
RICHARD H. FLORRID, Secretary

SOUTHERN ICE EXCHANGE
February 24-25, 1953
Ansley Hotel, Atlanta, Ga.
RICHARD H. FLORRID, Secretary

ASSOCIATION DIRECTORY

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

NATIONAL ASSOCIATION OF ICE INDUSTRIES
Guy W. Jacobs, Secy., 1706 L St., N. W., Washington 6, D. C.

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres. Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
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461 Market St., San Francisco, Calif.

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378 Eglinton Ave., Toronto 12, Canada

DELTA STATES ICE ASSOCIATION
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Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
R. H. Wilson, Secretary-treasurer
Delavan Ave. & Spruce St., Philadelphia, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary
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Cincinnati Terminal Warehouses, Inc.
Cincinnati, Ohio

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Clinton Pure Ice Co., Clinton, Ill.

INDIANA ASSOCIATION OF ICE INDUSTRIES
Robert W. Walton, Secretary
Board of Trade Bldg., Indianapolis, Ind.

KANSAS ASSOCIATION OF ICE INDUSTRIES
Matt Scherer, Secretary
McPherson Ice Company,
McPherson, Kansas

KENTUCKY ICE MANUFACTURERS ASSOCIATION
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217 E. Main St., Louisville 2, Ky.

MICHIGAN ICE INDUSTRIES ASSOCIATION
Edward W. Jackson, Secretary
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Booth Cold Storage Co., St. Louis, Mo.

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3820 Washington St., St. Louis, Mo.

MOUNTAIN STATES ASS'N OF ICE INDUSTRIES
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Espy Ice Co., 2101-31st St., Denver 5, Colo.

NEBRASKA ASSOCIATION OF ICE INDUSTRIES
Frank Vogelsang, Secretary
W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary
83 Winter St., Providence, R. I.

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Garth A. Shoemaker, president
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Washington, D. C.

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Capital Ice & Coal Co., Raleigh, N. C.

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Elizabeth Shannon, Acting Secy.-Treas.
The Steubenville Ice Co., Steubenville, O.

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
Harry T. Hudson, Executive Secretary
525 Cravens Building 7, Oklahoma City, Okla

PACIFIC STATES COLD STORAGE WAREHOUSEMEN'S ASSOCIATION
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SOUTH CAROLINA ICE MANUFACTURERS ASS'N
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SOUTHWESTERN CHAPTER, N.A.R.W.
C. P. Metcalf, chairman
Southwestern Ice & Cold Storage Co.,
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Mercantile Bank Bldg., Dallas, Tex.

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WEST VIRGINIA ASSOCIATION OF ICE INDUSTRIES
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Diamond Ice & Coal Co., Charleston, W. Va.

WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary
1300 East Locust St., Milwaukee, Wis.

NEW PLANTS and IMPROVEMENTS

This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

California

Los Angeles, Calif.—The Los Angeles Cold Storage Co. is building a new freezer for the handling of fish adjacent to the present fish warehouse.

Vernon, Calif.—The Pacific Refrigerating Company is building a half-million cubic foot refrigerated warehouse.

San Francisco, Calif.—The Union Ice Company is building two large warehouses, one in Claremont to handle orange juice concentrate, and one in Ventura for storage of lima beans and other frozen vegetables.

Florida

Leesburg, Fla.—A new cold storage warehouse is planned here by the Leesburg Construction Company, to be occupied by the Minute Maid Corp. The building will occupy an area of 100,000 square feet and will house three separate storage rooms with a total capacity of some 3,000,000 cubic feet.

Wildwood, Fla.—Plans are being considered by the Royal Palm Ice Company to increase its ice making and storage capacity with a new $100,000 addition to the present plant.

Nebraska

Omaha, Neb.—Located in the Omaha meat packing district, the U. S. Cold Storage Corporation's latest plant has begun operating with a 25 million pound storage capacity and 300,000 pounds freezing capacity per day. The plant is of single story construction occupying over seven acres.

Ohio

Ashtabula, Ohio—The Ashtabula Poultry Company plans an expansion program to its plant for preparing and packing packaging frozen poultry.

Cincinnati, Ohio—The Cincinnati Terminal Warehouses Inc. announces additional freezer space after converting 200,000 cubic feet from cooler space.

Oklahoma

Oklahoma City, Okla.—The Oklahoma Cold Storage Inc., opened for business September 1. The new plant consists of all freezers, with seven million pounds capacity.

Tennessee

Celina, Tenn.—William Moulton and Dr. C. E. Clark of Clay County, Tenn., have announced plans for the construction of a strawberry freezing plant here.

Washington

Kittitas, Wash.—The Kittitas Ice & Cold Storage Company has converted much cooler to freezer space. Zero capacity is now five million pounds.

Sales and Reorganizations

Cotton Plant, Ark.—Lonnie Crawford has purchased the Purity Ice Cream and Ice Company from Dr. W. J. B. Williams for $40,000. The new owner will operate the plant under the name of the Crawford Ice & Coal Company.

Flat River, Mo.—The ice plant recently purchased by the Pure Ice Company of Cape Girardeau has been leased to Neal Gillett. An ice vendor has been installed.

Madisonville, Ky.—Vaughn L. Wiman, former packing company proprietor, will operate the Wiman Packing Company, which he purchased from Louis Troop.

Clifton, N. J.—The former Mountain Ice Company plant at 12-36 Central avenue has been purchased by the Midwest Piping & Supply Company from the Rubel Corp. The one-story structure contains 24,000 square feet of floor area and is served by a siding of the Erie Railroad.

Mount Pleasant, Tenn.—The Burnett Crystal Ice Company has been purchased by the Northeast Texas Ice Company, owned by Clarence Stephens of Omaha. Both plants will be operated during the summer months, but one will be closed through the fall and winter.

New Incorporations

Kings, N. Y.—Charter of incorporation has been granted the Ajax Corporation of New York, to manufacture and install ice-making, refrigerating and ventilating systems, listing capital stock of 200 shares of no par value. Directors: Florence Heller, Hoyman Rothbart and Mortimer M. Rothstein, 25 West 43rd St., New York City.

New York, N. Y.—Charter of incorporation has been granted to Naco Freezer Company Inc. Manhattan, listing capital stock of 200 shares no par value. Directors are Janet L. Giroux, Chas. J. Coleman and Irving E. Moller, 51 Chambers St., New York City.

Wilson, Okla.—A charter of incorporation has been granted Zero Frozen Foods Company Inc. listing capital stock of $50,000. Incorporators are Joan Dillard and James H. Dillard, Ringling, Okla., and June Morris and H. L. Morris, Wilson.

Fire and Accident Record

Milton, Mass.—The Hendries ice cream plant was swept by a fire causing $250,000 damage. All the machinery was wrecked. The blaze started in the basement.

New York, N. Y.—An explosion leveled a one-story ice plant at 84 Dey Street, injuring the owner of the plant and breaking scores of windows. Cause of the explosion was not determined.

Greensboro, N. C.—A fire in the warehouse of the Rucker Cold Storage plant caused considerable damage, mostly by water.

Fredonia, Pa.—The big rambling plant of the Buffalo Frosted Foods Company was a mass of rubble as a result of a spectacular fire. The loss, according to Louis Catalano, secretary of the company, amounted to at least $300,000.

Oroville, Wash.—A fire of undetermined origin destroyed the Albert Lehrman apple warehouse eleven miles north of Oroville, with loss estimated at $150,000, including much valuable packing and cold storage equipment.

Icy Items

New Orleans, La.—Ice Refrigeration, Inc. has filed notice of dissolution of its charter of incorporation with the office of the secretary of state.

Joplin, Mo.—The Polar Ice & Supply Company has been formed to deal in ice, soft drinks and liquors, with capital stock of 2,800 shares $25 par value. Incorporators: R. C. Griesser, A. W. Griesser, N. Van Fleet.

DEATHS

William H. Kantner

THE DEATH of William Houston Kantner, prominent civic leader of Somerset, Pa., occurred August 24 in the Somerset Community Hospital. Mr. Kantner organized the Somerset Ice Company which he headed for 27 years. He also owned and operated the Somerset House for a number of years. He leaves his widow, Clara M. Loyd Kantner and a daughter, Miss Dorothy Kantner.

ERNEST W. REINWALD, Mansfield, Ohio, an engineer for the Ashland Ice & Coal Company until he retired some years ago died September 2. He was 85. He is survived by a daughter, Mrs. Hermine Jacobs.

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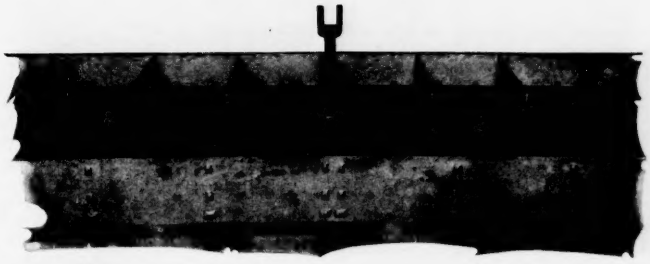

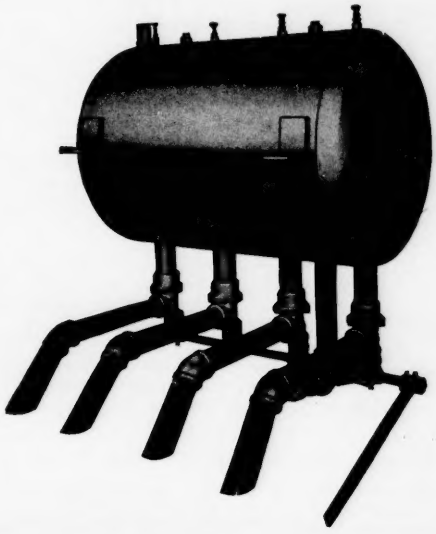

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4 **FLOOR SPACE ECONOMY**
Compact, the KRAMER AMMONIA THERMOBANK takes no valuable floor space. All defrosting devices are outside the refrigerated space.

5 **SIMPLICITY**
Minimum controls—standard, time-tested and easily obtainable—are used in the KRAMER AMMONIA THERMOBANK.

6 **NO DRAIN FREEZE-UPS**
Heated drain pan and drain during defrost eliminates ice accumulation and freeze-ups of the drain line.

7 **TEMPERATURE CONTROL**
Uniformity of temperature is made possible by the short-time defrost, characteristic of THERMOBANK.

WRITE NOW FOR BULLETIN NO. TA-182

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Research Group for Dry Ice Meets in Germany

MEMBERS of the "Internationale Forschungsgemeinschaft für Trockeneisanwendung" (International Research Group for the Utilization of Dry Ice) which is headed by Dr. Bauer but thus far is not a legal entity, members of the "Arbeitsgemeinschaft Trockeneis e. V., Bonn" (Working Group Dry Ice, registered association, Bonn), and other interested persons, also some foreign countries, met in Bad Homburg, May 25, 1952.

The meeting showed the general interest existing in a closer cooperation on an international basis which should cover the entire field of dry ice techniques and all questions concerning dry ice application, in order to widen the range of the efforts which have been made heretofore.

The meeting elected a committee composed of the following members: Dir. Bolla, Soc. Asteria—Milano; Dir. Kaeli, La Carboonique Belge—Schoten-Antwerpen; Dir. Rufener, Carba—A. G., Bern; Dir. Nils Gäbel, De Förenade Kolsyrefabr's, Liljeheholmen—Stockholm; Dir. A. D. Ross, London; Dir. Gasser, Les Carboniques Liquides Réunies—Nancy; Dir. Sorensen, Union Kulsyrefrabr.'s—Fredericia; Dir. Tovote, Kohlensäurewerk Hannover—Rethen Line; Dr. R. Bauer, Mühlen b. Horb a. Neckar; Dir. Bertheau. Kühltransit A. G.—Hamburg; Dir. Albers, Kohlensäurewerk Harburg—Elbe; Obering. J. Kobold, Maschinenfabrik Esslingen; Dr. Link, Trockeneis—Vertrieb, Ludwigshafen a. Rhein; U. H. Gottschalk, Böhn & Gottschalk — München; Dr. Lindner, Kohlenäurewerke Lindner—Bad Hauheim.

This preparatory committee should clarify at first whether the ideas expressed by this meeting will meet with sympathy in wider circles, too, and thus may furnish the basis for the incorporation of the "Internationale Trockeneis-Vereinigung" (I. T. V.).

On July 25, 1952, the German members of this committee met in Bad Nauheim.

In the meantime, contact was taken up with several more interested persons who declared willing to cooperate, and the desire was generally expressed to proceed with the establishment of the intended international association which would also comprise the already existing International Research Group for Dry Ice Application.

The basis of this association is the common interest of all members to further extend the sale of Dry Ice and in connection with this object the discussion of all questions concerning Dry Ice techniques, e. g.: Improvement of production, marketing, application research, exchange of experience and information, development of new working methods, etc.

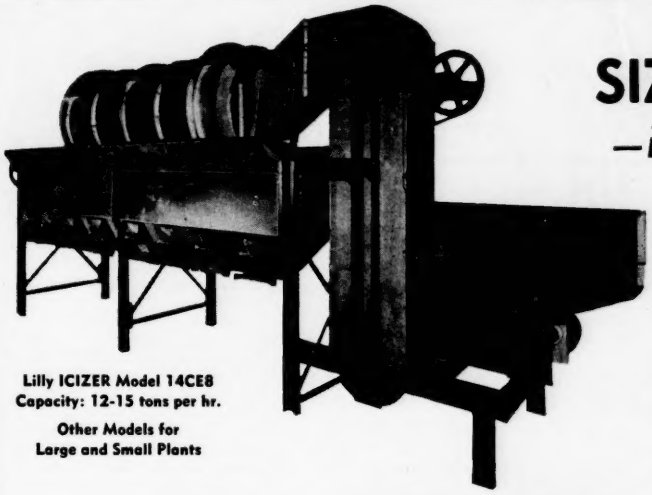
Therefore, the international association would be vertically ramified as follows: Production, consumption, construction of plants, transport problems, sale and packing. The transverse organization would comprise a commercial and a technical committee.

Director Tovote, of Kohlensäurewerk Hannover, (22a) Rethen/Leine, was elected chairman of the preparatory committee for the establishment of an association called "Internationale Trockeneis-Vereinigung."

The organization meeting of this "International Dry Ice Association" is scheduled to precede or follow immediately the "Käl-te-Tagung" (Refrigeration Congress) which was scheduled to be held at Stuttgart in September.

New Trawler for Fish Freezing

THE Department of Science and Industrial Research of Great Britain has asked Hull Russell & Co. Ltd. Aberdeen, Scotland to build a research trawler to conduct research on processing and quick freezing fish at sea.



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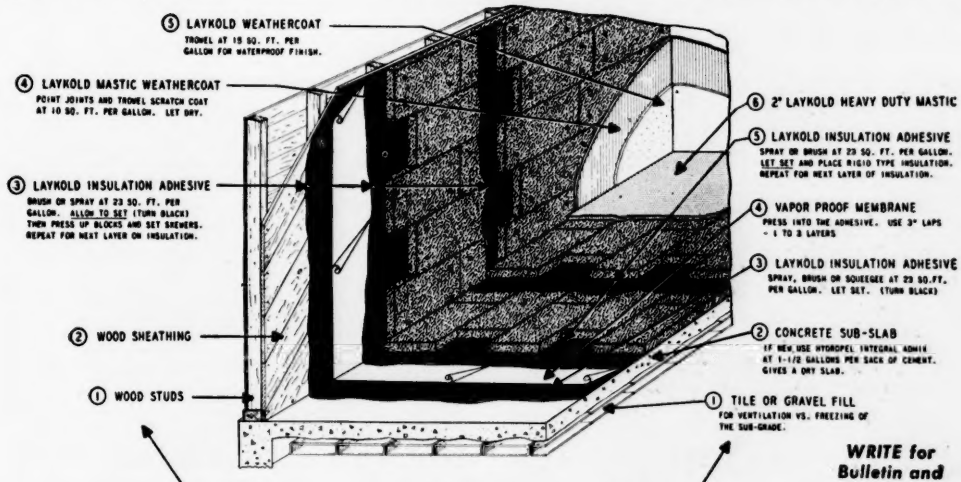
DATA SHEET No. 2

How to HOLD Insulation on a WOOD WALL and CONCRETE FLOOR


5 LAYKOLD WEATHERCOAT
TROWEL AT 15 SQ. FT. PER GALLON FOR WATERPROOF FINISH.
4 LAYKOLD MASTIC WEATHERCOAT
POINT JOINTS AND TROWEL SCRATCH COAT AT 10 SQ. FT. PER GALLON. LET DRY.
3 LAYKOLD INSULATION ADHESIVE
BRUSH OR SPRAY AT 23 SQ. FT. PER GALLON. ALLOW TO SET (TURN BLACK) THEN PRESS UP BLOCKS AND SET SHEWERS. REPEAT FOR NEXT LAYER ON INSULATION.
2 WOOD SHEATHING
1 WOOD STUDS
WALLS
6 2" LAYKOLD HEAVY DUTY MASTIC
5 LAYKOLD INSULATION ADHESIVE
SPRAY OR BRUSH AT 23 SQ. FT. PER GALLON. LET SET AND PLACE RIGID TYPE INSULATION. REPEAT FOR NEXT LAYER OF INSULATION.
4 VAPOR PROOF MEMBRANE
PRESS INTO THE ADHESIVE. USE 3" LAPS - 1 TO 3 LAYERS
3 LAYKOLD INSULATION ADHESIVE
SPRAY, BRUSH OR SQUEEGEE AT 23 SQ.FT. PER GALLON. LET SET. (TURN BLACK)
2 CONCRETE SUB-SLAB
IF NEW, USE HYDROPEL INTEGRAL ADMIX AT 1-1/2 GALLONS PER SACK OF CEMENT. GIVES A DRY SLAB.
1 TILE OR GRAVEL FILL
FOR VENTILATION VS. FREEZING OF THE SUB-GRADE.
FLOOR
CONSTRUCTION SEQUENCE

WRITE for Bulletin and Specifications

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What's New

MACHINERY
APPLIANCES • PROCESSES

Plasticork Offers New Insulation Service

A NEW material called Plasticork, that allows on-the-job fabrication of insulating fittings for cold lines, has been developed by the Building Materials Division of the Armstrong Cork Company. The new material is a tacky, moldable granulated cork-and-rubber composition, furnished in bulk form, that may entirely eliminate the use of molded fitted covers in some applications and supplement the use of fitted covers in other uses.

Plasticork promotes flexibility and speed since it allows the workmen actually to mold a fitting cover to the proper size and thickness on the job by shaping the material by hand to the fitting being insulated.

Plasticork can be used in any application where regular cork fitting covers can be applied. It is built up on the job in the same thickness as molded fitting covers or the cork covering on adjacent piping. It is non-corrosive on contact with all ordinarily used metals. It maintains its plastic and tacky qualities indefinitely so that it can be held in stock for years without losing its moldable characteristics. It also can be removed from a fitting and reused without loss of insulating efficiency or workability.

One of the advantages of the new material is that it eliminates the difficult and time-consuming task of cutting standard molded covers to fit in close quarters or over nested fittings. In addition, it eliminates the delay that often results from waiting for special fittings to be made and shipped to the job site. Its composition contains 80 per cent cork particles by volume.

Safety Thermostat Prevents Overcooling and Freezing

A LOW temperature safety cut-off in an ammonia-cooled heat exchanger prevents freezing and possible spoilage of the product if the regular temperature controller permits the temperature to fall too low. The cut-off action is provided by an inverse Thermoswitch, a thermostat manufactured by Fenwal Inc., of Ashland, Mass. As shown in the accompanying diagram, the safety thermostat is placed in the line from the cooling unit where it can sense the temperature of the coolant before it enters the heat exchanger.

Ammonia is circulated through the system by suction. The Thermoswitch is wired in series with a solenoid which controls the action of an ammonia back-pressure valve. At normal operating temperatures, the thermostat contacts are open, permitting the back pressure valve to remain closed. When the temperature drops to the danger point, the thermostat contacts close and trip the solenoid. This forces the valve to open, destroying the suction in the line. The coolant then ceases to circulate until the temperature returns to normal levels. Thereupon the thermostat will again de-energize the solenoid, restoring suction in the line.

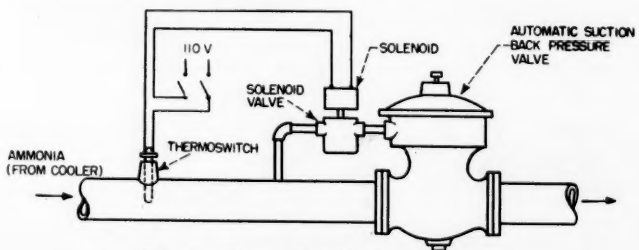


Diagram shows action of safety thermostat

Armstrong's Plasticork, newly developed insulating material for cold line fittings, is molded into a fitting cover right on the job. A workman is shown above packing Plasticork into all of the voids of the fitting as the beginning of the insulation of a cold line fitting.

After the correct thickness of Plasticork has been applied to the fitting, either twine or friction tape may be used to hold the Plasticork in place prior to the application of the finish. A workman is shown above applying friction tape over the Plasticork.

We bend over backwards for You!

Whatever the refrigeration job, there's an easy-to-read Taylor mercury-in-glass thermometer designed especially for it. Shown here are just 4 of the many types for **Cold Water and Brine Lines, Insulated Brine or Ammonia Lines, Condenser and Water Lines, Hot Water and Steam Lines, Ammonia Discharge Lines, Brine Tanks and Cold Storage Rooms.**

Wide selection of bulb and stem styles and angles. Temperature ranges from minus 40° to +950°F or equivalent Centigrade. Rattle and dust-proof cases. Extra thick glass. 3-times-easier-to-read BINOC* tubing.

For brine tanks

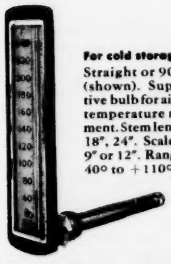
Oblique angle (150°) designed for easy reading below eye level. Adjustable connection, 1" diameter brass stem. Stem lengths 12", 24", 36". Scale length 12". Range minus 40° to +110°F.

For small diameter brine or ammonia lines

½" fixed thread connection. Stem extends 1" below the thread, 7" scale graduated in 2° divisions. Case is insulated from scale to insure accurate temperature measurement. Range minus 20° to +120°F.

For insulated brine or ammonia lines

Insulated stem, straight (shown) or 90° angle. Separable socket connection. Scale lengths 7", 9", 12". Range minus 40° to +110°F.



For cold storage rooms

Straight or 90° angle (shown). Supersensitive bulb for air and gas temperature measurement. Stem lengths 12", 18", 24". Scale lengths 9" or 12". Range minus 40° to +110°F.

*Reg. U. S. Pat. Off.

There's a Taylor Thermometer for your temperature measuring problem—no matter what it is. Ask your Taylor Field Engineer, or write for **Catalog 300.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

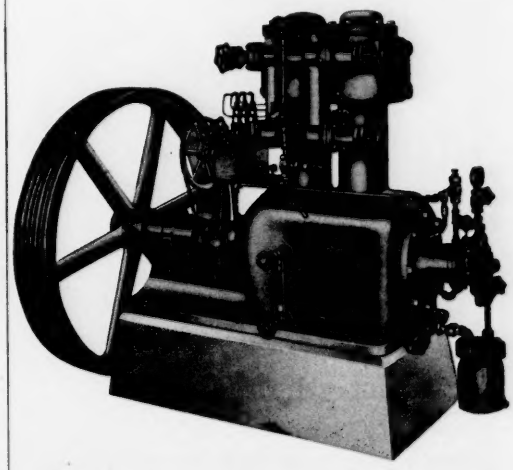
Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

Sterling

...KNOWN AROUND THE WORLD FOR DEPENDABILITY

. . . . . a global fame built by more than half-a-century of engineering progress and constantly increasing production facilities. Check over your requirements now — write us for prices and complete information on Sterling ammonia compressors, condensors, receivers, ice tanks, surge drums and related products. We will be happy to furnish you with the name of your nearest STERLING distributor!



REYNOLDS MANUFACTURING CO.

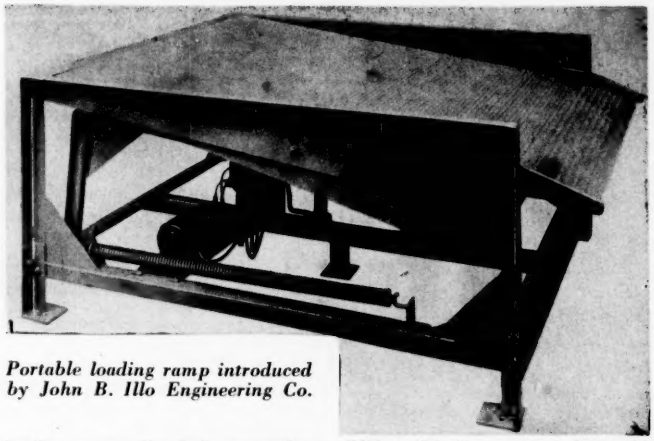
SPRINGFIELD · · · MISSOURI

Portable Loading Ramp

A PORTABLE loading ramp unit that enables one man to perform the work of ten, with push-button control, has just been introduced by the John B. Illo Engineering Company, 2414 East 57th Street, Los Angeles 58, Calif. This unit is now being used by leading manufacturers, wholesalers, brewers, super markets, department stores, and freight lines across the country. It eliminates costly standby time of trucks and men waiting to load or unload. Portability and adjustability are its two outstanding features. It can be installed in five minutes at any loading dock and its hydraulically operated dock adjusted to any truck bed height in a few seconds.

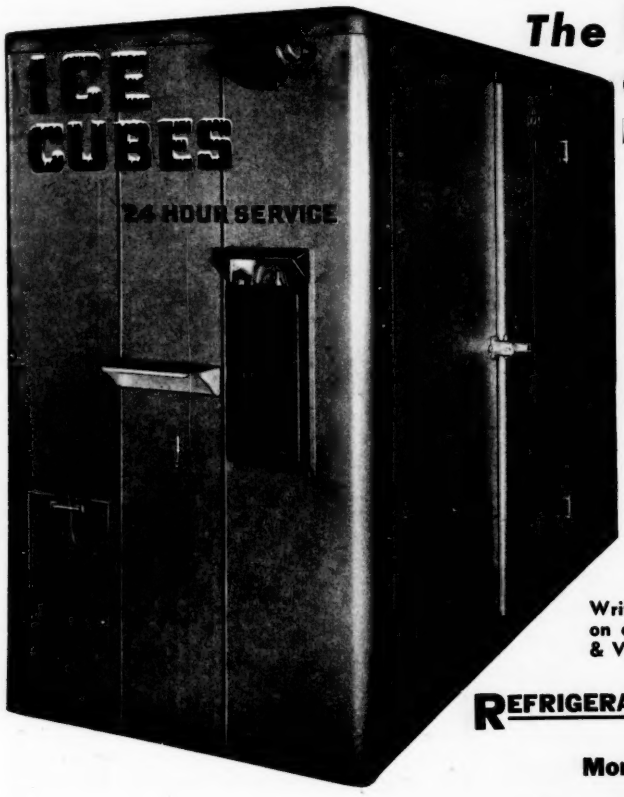
Available in two models, manual and electrically powered, this ramp cuts loading costs by as much as 75 percent and effects a saving in time and labor. The electrically operated unit requires a 110-volt outlet.

Another attractive feature is an adjustable throw plate which can be raised or lowered for installation inside buildings without interfering with doors. The throw plate can be locked in horizontal position during loading, as can the deck, preventing accidental moving. Leg supports, which are not required for "recessed" installations, are furnished with "in-front-of-dock" ramps.



Portable loading ramp introduced by John B. Illo Engineering Co.

The unitized power unit assembly consists of 110-volt, single phase ½ hp. ball-bearing drip proof motor directly connected to a ⅜ in. standard Viking 350 lb. pressure hydraulic pump. It operates from any light socket. The ramp is counter balanced by heavy duty tension-type coil springs to eliminate additional load on truck beds. Its capacity of 20,000 lbs. assures an ample safety factor. It is shipped as a unit, completely assembled, ready to operate.



The NEW POLAR
CUBED and CRUSHED
ICE VENDING STATION

Fits in small space—easily placed.

(Cabinet is 8′ 10″ long, 6′ 6″ high, 46″ wide.) *Specially suited for heavily populated downtown locations.*

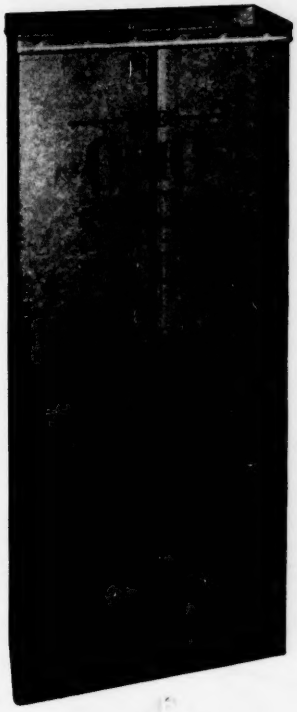
We Invite You to Visit Us At BOOTH No. 26
Hotel Netherland Plaza
National Assoc. of Ice Industries Convention
Cincinnati, Ohio
Nov. 11-14
POLAR Premium Ice Vendor on Display

Check These POLAR Features:

- ★ **Embossed aluminum cabinet**
- ★ **Shipped ready-to-operate**
- ★ **Equipped with automatic electric defrost**
- ★ **One-piece aluminum roof**
- ★ **Ice can be bagged in station.**

Write for Free Specifications and Prices—on our complete line of Polar Ice Stations & Vendors.

REFRIGERATION ENGINEERING CO.
Dept. 1052.
Montgomery, Minnesota



Welded Cans
Integral Tube Cans
Arctic Pownall Cans
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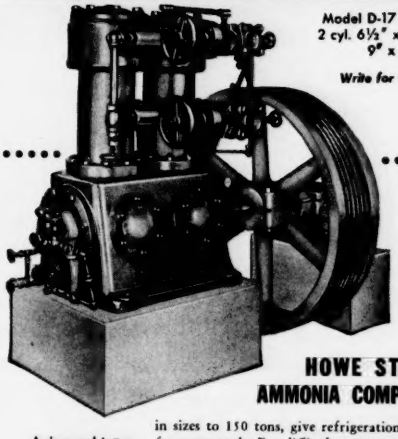
Industrial Trucks and Trailers

We welcome you at Booth 23, NAII Convention, Cincinnati, Ohio, Nov. 11-14

THE OHIO GALVANIZING & MFG. CO.
NILES OHIO

IN REFRIGERATION *it's All in knowing* HOWE



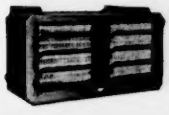
Model D-17 and D-40
2 cyl. 6½" x 6½" and 9" x 9"

Write for Catalog

HOWE STANDARD AMMONIA COMPRESSORS

A size and type for every job! in sizes to 150 tons, give refrigeration that's exact for your needs. For difficult two-temperature jobs, use HOWE "ME" Compressors. You save on first cost, power, installation and maintenance.

HOWE POLAR CIRCLE COILS produce 6-way savings: price, space, labor, weight, refrigerant and freight. Built for heavy duty use in meat packing, ice cream, quick freezing, ice and cold storage plants. Provide greatly improved refrigeration that assures better product control. Write for details.



DOUBLE FAN UNIT COOLER

40 YEAR'S SPECIALIZATION
Since 1912 manufacturers of ammonia compressors, condensers, coolers, fin coils, locker freezing units, air conditioning (cooling) equipment.

A few territories still open . . . write for details about the HOWE profit-plan for new distributors.

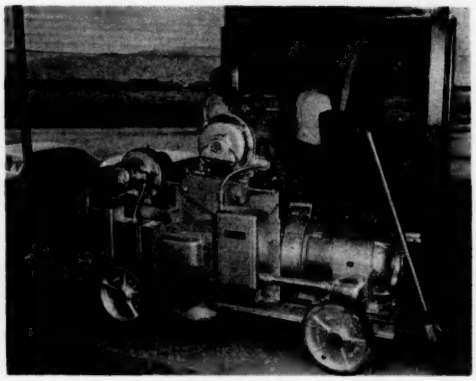
HOWE ICE MACHINE CO.
2829 Montrose Ave., Chgo 18 Cable: HIMCO, Chicago
DISTRIBUTORS IN PRINCIPAL CITIES

Using Portable Blower For Icing Perishables

TO refrigerate trucks loaded with perishable vegetables and fruit, time is saved and labor is reduced by adopting the blower method in place of distributing cracked ice. Total costs of refrigerating a loaded truck have been reduced as much as 50 per cent according to officials of C. A. Glass Company Inc., of Indio, Calif., who are using a portable ice blower, electrically powered to supplant manual icing.

The blower unit mounted on a 4-wheel steel chassis incorporates two ice crushers and a blower, each with electrical controls, with wiring encased in sealed conduits so that moisture cannot contact the wiring or motor elements. Full size cakes of ice are slid into the primary crusher for breakage into aggregates suitable for fine crushing. The primary crusher is powered with a U. S. Syncrogear Motor of 10 hp. operated at 1800 rpm. The broken ice feeds into a pulverizer powered with a U. S. Uniclosed Motor and is reduced to finely subdivided particles suitable for blowing.

From this crusher the ice feeds direct into a rotary blower which is bracket-mounted to a 25 hp. motor operated at 1800 rpm. The pulverized ice is blown through a 6-inch rubber hose which is directed by the operator. Ample pressure of the ice blower throws the stream of ice to the farmost end of the largest capacity truck or trailer. As layer upon layer of boxes of vegetables or fruit are packed in the truck, a blanket of ice is blown in and fills around the boxes and on top.



Portable Ice Blower

This method permits uniform distribution of ice throughout the truck, resulting in more efficient refrigeration and a saving in ice. No lugging of ice is necessary. Pulverization of the ice takes place at the moment it is applied, thus eliminating premeltage.

The only attention necessary to the unit is to have the full size ice cakes available to feed the machine. Start and stop controls are conveniently arranged so that a single operator can control the machine and direct the blower.

Previous to the employment of this unique icer, which was furnished by the Food Machinery and Chemical Corporation, Riverside, California, the Company required the services of three men to handle the distribution of ice, and the truck was tied up for additional periods of one to three hours to complete the icing which resulted in extra meltage as well as high icing costs and delay in getting the truck out on the road.

When a series of trucks are being simultaneously loaded, a single icing unit is sufficient as it can be wheeled from truck to truck, a bank of ice blown in, and progressively the trucks are all iced.

SERVING THE ICE INDUSTRY FOR 20 YEARS

Dependable . . Automatic . . Refrigerated

S&S ICE VENDING STATIONS AND ICE VENDING EQUIPMENT

Sold by Leading Ice Equipment Distributors Throughout The Nation

S&S Vending Machine Co.

670 LINCOLN AVE., SAN JOSE, CALIFORNIA

Extra rugged in construction

WELLS, PUMPS— COMPLETE WATER SUPPLY UNITS

Layne puts a lot of extra ruggedness into the construction of their well and pump installations. This means that there is seldom repair expense of any kind for years to come. And matching ruggedness is the widely known and acknowledged Layne quality.

Why not have Layne install a water well supply on your property? The saving in water cost will more than justify the expense. For further information, catalogs, etc., address

LAYNE & BOWLER, INC.

General Offices, Memphis 8, Tenn.

Layne

WATER WELLS

VERTICAL TURBINE PUMPS

WATER TREATMENT

400 TONS CAPACITY

PATENTED DUO-PASS and OILOUT

Aeropass CONDENSER

U. S. Patent Reissue No. 21,917; 22,553

YOU USE LESS POWER...
SAVE CONDENSER WATER...
SAVE UPKEEP COST

For large refrigeration systems, NIAGARA gives you a choice between a battery of condensers (that may be cut on or off with the load) or a high capacity condenser that saves space.

Both have the patented "Duo-Pass" and "Oilout" that remove superheat and keep the system free of oil. Results: you save one-third or more of power cost and upkeep expense. Niagara Patented Balanced Wet Bulb Control gives lowest head pressure operation automatically. *Write for Bulletin 111.*

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Over 35 Years Service in Industrial Air Engineering

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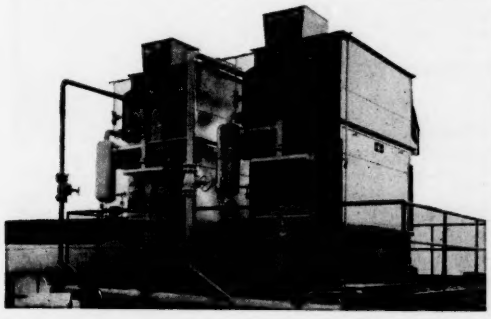
Field Engineers in Principal Cities of U. S. and Canada



Need Calcium Chloride for Brine Making?

Call SOLVAY TRADE MARK REG. U. S. PAT. OFF First!

- **For Immediate Delivery** from dealers and warehouse stocks in principal cities.
- **For Quality**—SOLVAY CALCIUM CHLORIDE flows easier, requires less pumping; it allows safe operation at low temperatures, permits quicker freezing.
- **For Economy**—SOLVAY CALCIUM CHLORIDE provides a "long-life" brine that costs less in the long run. It assures maximum life of your equipment and reduces the possibility of costly shut-downs and repairs.
- **For Technical Service**—SOLVAY TECHNICAL SERVICE is available without charge to help with your brine problems.

MAIL COUPON for Free Brine Maintenance Chart . . . prices and location of nearest stock . . . and information on the preparation, strengthening and maintenance of Calcium Chloride Refrigeration Brine.

SOLVAY Calcium Chloride

SOLVAY PROCESS DIVISION, Allied Chemical & Dye Corp. **61 Broadway, New York 6, N. Y.**

Please send me, without any cost or obligation, your free Brine Maintenance Chart . . . prices and location of nearest stock . . . and information on the preparation, strengthening and maintenance of Calcium Chloride Refrigeration Brine.

Name_____

Company_____

Address_____

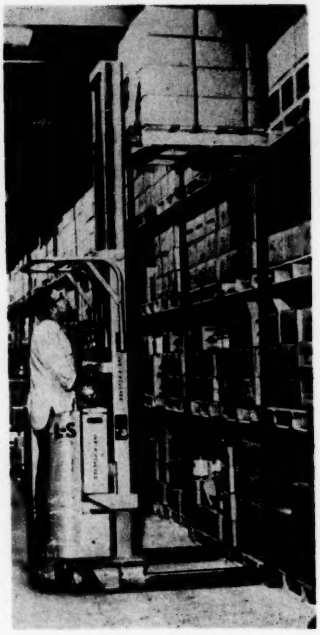
City_____ Zone_____ State_____

58-10

New Fork Truck Meets Space Restrictions

A NEW electric fork truck, Spacemaster Model M, has been introduced by Lewis-Shepard, designed to meet space restrictions and floor loading limitations. The new model is of stand-up, out-rigger design, manufactured in three types: straddle, open face pallet and platform. The design makes possible right-angle stacking in less than 6 foot aisles. The usual 10 to 12 inch aisles can be reduced by 50 per cent, according to the manufacturers. It is only about one-half the usual weight of electric fork trucks; hence, an installation is possible where floor load capacities have been insufficient.

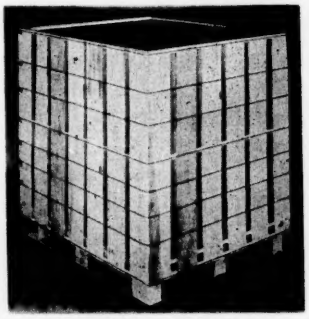
Other features include articulated linkage, i.e., the load carrying section of the truck is joined by links to the drive unit to ride smoothly over uneven floors. It assures constant drive traction and easier steering at all times. The two outboard stabilizing casters provide a total of four points of support under the load (not including the drive wheel). It means more stability both in transporting and high stacking the load. Safety to both load and personnel is greatly increased. These two important features are exclusive. All controls have been designed into a compact assemblage.



Lewis-Shepard Spacemaster Fork Truck — Model M

Palletized "Tote" Box For Small Packages

A "TOTE" box for handling numerous small packages, with palletized bottom, is being offered by the American Box Co. This box, of wirebound lumber construction, is shipped knocked down for space saving shipping and storage. It is easy to assemble, unfolding into a completed box ready for service. They are available in different and special sizes, types and shapes to meet exact requirements. A special palletized bottom is made to fit fork lift trucks.



New Palletized Tote Box

There's nothing like a VOSS VALVE

to make good compressors operate better

to make worn compressors operate like new!

It is a matter of record that every time an ordinary compressor valve is replaced with a specially designed VOSS valve, the immediate result is increased efficiency and greater output . . . and this record covers thousands of installations, as reports testify.

VOSS VALVES are made to specifications for air, gas and ammonia compressors; from 1" to 16" in diameter and for pressures from minus 27HG to 7,500 pounds and for speeds up to 1,000 rpm and above.

VOSS VALVES are machined from solid stock (not cast)—PLATES are machined and ground (not press formed) for precise high-tolerance fit; VALVES and PLATES are of heat-treated alloy and stainless steel; the PLATES are dimensionally stable, ductile, resist fracture, high temperatures and corrosion; withstand fatigue; won't chip, crack or score cylinder walls.

Don't be fooled by similarity in appearance. Be sure your replacement valves and plates are marked "VOSS" and obtain the VOSS values developed by 32 years of specialized compressor valve engineering and experience.

VOSS VALVES and PLATES ASSURE

- Quiet, vibration-free operation
- 20 to 60% more valve area
- Less power consumption
- Low Pressure loss
- Normal discharge temperature
- Lower operating costs

To increase the efficiency of your compressor, send us the name, bore, stroke and speed of your machine. Our detailed proposal will be sent without obligation.

J. H. H. VOSS VALVES REG. U.S. PAT. OFF.

J. H. H. VOSS CO. INCORPORATED

783 East 144th Street, New York 54, N. Y.

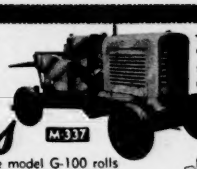
BETTER SERVICE-BIGGER PROFITS

TRI-PAK *Crusher-Slingers*

A CHOICE OF FIVE MODELS TO FIT YOUR PARTICULAR OPERATION .....

There is a Tri-Pak ice crusher-slinger for every icing need. Whether you ice fishing boats, top ice carloads of vegetables, or re-ice refrigerator trucks, one of Tri-Pak's five sturdy, dependable units is size-rated for your job. All Tri-Pak crusher-slingers save labor by taking full-sized 300 pound blocks of ice. You can depend on these well engineered, sturdily built icing units.

The "Mobil-Icer" is here icing a carload of carrots at the rate of 5 tons every 7 minutes. The trailer mounted "Mobil-Icer" is ideal for team track icing as it can be towed by the truck carrying the ice. The unit is powered by an 8-cylinder Ford industrial engine. Capacity is 55 tons per hour.



The M-337, known as "Mobil-Icer," is ideal for team track icing with a capacity of 55 tons per hour. Powered by an 8-cylinder Ford industrial engine.

The model G-100 rolls easily on 3 rubber-tired, ball bearinged wheels. Powered by an 8 cylinder Ford industrial engine. Capacity 55 tons per hour.

The G-35 crusher-slinger is for icing operations where its capacity of 750 pounds per minute is adequate. Takes full 300 pound blocks.

The E-40 combines high capacity with the quietness and dependability of the electric motor. Capacity 55 tons per hour. Powered by a 10 HP electric motor for crushing, 30 HP motor for slinging.

The E-13 has a capacity of 600 pounds per minute. Uses one 3 HP and one 10 HP electric motor.

TRI-PAK MACHINERY SERVICE, Inc. ★ HARLINGEN TEXAS

YOUR CATALOG

TRI-PAK MACHINERY SERVICE, INC.
HARLINGEN, TEXAS

Please send us your icing equipment catalog.

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MODERN REFRIGERATION

This official organ of the British Refrigerating Industry incorporates the two original British Journals *"Cold Storage & Produce Review"* and *"Ice & Cold Storage"*. Now in its 54th year. *"M.R."* gives the latest reliable technical and practical information.

Subscription, post free ..... $4.00 a year

Send for free specimen copy.

MODERN REFRIGERATION, Empire House, St. Martin's-le-Grand, London E.C. 1., England.

BLOWERS WITH V-P-L

For year-round satisfaction, blowers must deliver positive Volume at required Pressure and Low power cost. Performance of R-C Rotary Positive Blowers has been proved for many years in large and small plants.

Send for Bulletin R-C 1247 without obligation

ROOTS-CONNERSVILLE BLOWER DIVISION
525 Columbia Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES INC

BOWER
BB BRAND
AMMONIA

Purity of product and immediate shipment are two good reasons for specifying Bower Brand. Please keep empty cylinder rotating.

Est. 1858

HENRY BOWER CHEMICAL MANUFACTURING COMPANY
29TH AND GRAY'S FERRY ROAD
PHILADELPHIA 46, PA.

MANUFACTURERS' NEWS

Wright Chemical Enters Sales Agreement

THE Wright Chemical Corporation of Chicago, specialists in water conditioning for the control of corrosion, scale, and algae, have entered into a sales agreement with the Refinite Sales Company, Omaha, Neb., for the sale of external water treating equipment, according to an announcement from V. L. Merle, President of Wright Chemical Corporation.

The new sales agreement will enable Wright to offer Demineralizers, Dealkalizers, Deaerating Heaters and other equipment for the mechanical conditioning of water on a nationwide basis. The complete services of the Wright Technical Staff and Laboratory will now be made available to many more industrial plants throughout the nation. Mr. Merle states that his company is now able to provide customers with a complete water treating program.

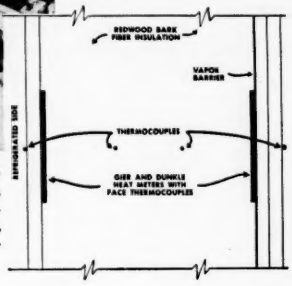
Final arrangements and contracts were completed at a meeting attended by Mr. Merle of Wright Chemical; M. H. Ostenberg, President, Charles A. Spaulding, Jr., Vice President and General Manager and David H. DeWindt, Industrial Sales Manager, of Refinite Sales Company.

Complete information on the new sales arrangement and on Wright Water Conditioning Service may be obtained by writing direct to Wright Chemical Corporation, 627 West Lake Street, Chicago 6, Illinois.

In-place field tests show effects of
HEAT STORAGE FACTOR

Above: A potentiometer was used to observe the flow of heat through heat meters placed on the interfaces of outside and inside walls. Simultaneously, an electronic recorder registered temperatures outside, inside, and at various points through the insulation over extended periods.

Below: Vertical wall section showing typical placement of heat meters and thermocouples to determine flow of heat through Palco Wool Insulation.



...of PALCO INSULATION WOOL in actual use

Modern scientific techniques now measure actual heat flow through insulated walls in commercial refrigerated structures. Resulting test data proves heat-storage factor of Palco Wool contributes to efficient low temperature control. In-place tests show that heat entering the wall during peak outside temperature periods flows back to the outside during minimum temperature periods. Palco Wool retards residual heat so that it reaches the cold side during minimum outside temperatures. For this and other valuable data, request Technical File No. IR-5.

CERTIFIED INSULATION

THE PACIFIC LUMBER COMPANY
100 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA
35 EAST WACKER DRIVE, CHICAGO 1, ILLINOIS

Refrigeration Sales Manager for Taylor Instrument Companies

ALBERT C. MAHANA has been appointed manager of sales to the refrigeration industry for the Taylor Instrument Companies of Rochester, N. Y. He will also be in charge of sales to the lumber and paper industries. Mr. Mahana, a graduate of St. Lawrence University, came with the organization in 1944. After a training period at the home office, he served as an industrial sales engineer in both the Pittsburgh and Syracuse territories. His experience in the field and with the inside sales division makes him well qualified for his new assignment. He succeeds Clayton D. DeMers who has retired after 24 years of service with the comapny.

New Vending Equipment

THE following ice companies, encouraged by the nationwide heat wave this summer, have installed S&S ice vending equipment.

Atlantic Ice Co., Bristol, Pa.
Phillipsburg Ice Co., Phillipsburg, N. J.
Krystal Ice Co., King City, Calif.
Regal Petroleum Corporation, Santa Cruz, Calif.
City Products Corp., Dayton, Ohio
Anderson Ice Co., Port Clinton, O.
Belle Springs Ice Co., Abilene, Kans.
Home Ice Co., Dublin, Texas
Milam & Williamson Co., Blythe, Calif.
Ebner Ice & Cold Storage Co., Vincennes, Ind.
Santa Monica Cold Storage, Santa Monica, Calif.
Fresno-Madera Ice Co., Fresno, Calif.

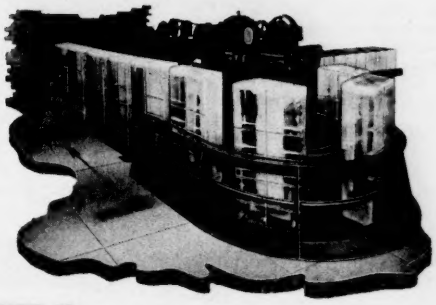
Frick Centennial

THE Frick Company will celebrate its 100th birthday anniversary with the publication of a complete history of the firm, which will trace the development of both its farm and refrigerating machinery. George Frick began making steam engines in 1850 and three years later established the company which bears his name. The new history will be letter size (8½ x 11 inches) and will contain about 150 illustrations.

PERFECTION CONVEYOR SPECIAL

MECHANIZE...

Yes, mechanize and reduce the costly handling operation of your plant. Ice can be carried on inlet conveyor into Perfection Special Conveyor type Scoring Machine, scored, headed up, then delivered straight, or at any angle (left or right) to storage or loading platform. Submit your particular problem, a sketch and definite price quotation will be sent promptly.



NEED PARTS?
We carry a complete line of Perfection, Miller and Peerless parts, available for immediate shipment.

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Peerless
Perfection Ice-A-Teria
Ice Scoring and Vending Machines

DISTRIBUTORS OF
Mathieson Ice Crushers

QUICK DELIVERY!

PERFECTION ICE SCORING MACHINE CO.

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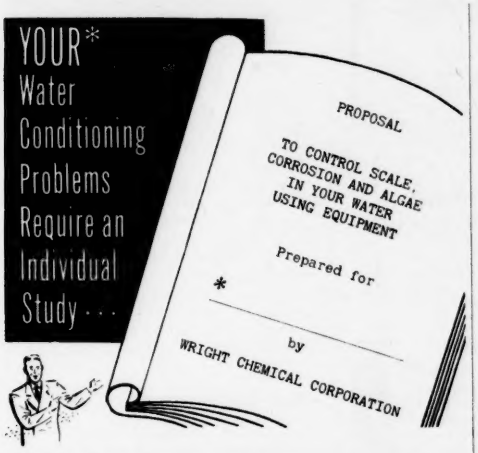
YOUR* Water Conditioning Problems Require an Individual Study...



A report like this, prepared especially for you, can save you hundreds and often thousands of dollars in unnecessary maintenance costs and production losses.

Wright Water Conditioning Service is *complete!* It starts with a scientific laboratory analysis of your individual water condition problems, followed by a written proposal for the solution. After you adopt our recommendations, we make constant checks to insure proper performance.

This Wright Service is available without cost or obligation. Write us or call your Wright Field Engineer today for a complete survey of your specific water conditioning problems.

WRIGHT CHEMICAL CORPORATION
GENERAL OFFICES AND LABORATORY
633 WEST LAKE STREET, CHICAGO 6, ILLINOIS

Offices in Principal Cities
Distributors of Nelson Chemical Proportioning Pumps and Refinite Softeners and Other External Treating Equipment.

Wright CHEMICALS
Specializing in Water Conditioning

The GENESEE Brewery

The Preferred Beer of Ale Quality

ENDS COOLING PROBLEMS With New STERLING KOOLER KUBES*

*Trademark International Salt Company, Inc.

"Before using Kooler Kubes we had trouble with ordinary salt caking in the pump pans of our brine spray units. Kooler Kubes dissolve evenly and eliminate this trouble. They are also easier to handle and store."

HAROLD KING, *Chief Engineer*
The Genesee Brewing Co., Inc.
Rochester, N. Y.

Kooler Kubes are special, heavily compressed 50-lb. refrigeration salt cubes for unit coolers, brine spray cold diffusers, and spray deck systems.

FOR ADDITIONAL INFORMATION SEND COUPON NOW

INTERNATIONAL SALT COMPANY, INC.
Scranton 2, Pennsylvania

☐ Please have a representative call.

☐ Please send additional information.

Signed:
Name_____
Company_____
Address_____
City_____ Zone___ State___

Armstrong Cork Reports Good Business Outlook

NET sales of the Armstrong Cork Company in the first six months of 1952 totalled $99,672,014 and net earnings after taxes were $4,172,044, C. J. Backstrand, President, reports. These figures compare with net sales of $106,074,967, an all-time high for any six months' period, and net profits of $5,283,181 in the first half of last year.

Net earnings amounted to $2.61 per share of the common stock as compared with $3.40 for the corresponding period of 1951. If earnings for the first six months of 1951 were adjusted to show the retroactive effect of the Revenue Act of 1951, passed in October of last year, they would total $4,884,000, or $3.12 per common share. The subsidiaries operating abroad reported net earnings of $155,479 after taxes, as compared with $501,126 for the first half of last year.

"While the profit showing for the period under review is below that for the first half of 1951," Mr. Backstrand reported, "it represents an improvement over the record for the final six months of last year. The company continues in a sound financial condition. General business conditions, despite the adverse effects of international tensions, renewed government controls, and industrial unrest, are on the whole favorable. The force of high-rate spending by consumers, by industry, and by government should generate sustained demand for company products. Hence future sales prospects are encouraging."

Discussing the business outlook, Mr. Backstrand stated: "The building industry, which influences about half of the company's sales, experienced record activity during the first half of 1952. In the months immediately ahead, steel shortages will retard some construction schedules, especially for industrial and public utility projects. Nevertheless, a steady high volume of sales of building materials and floor and wall coverings is in prospect. Material sales for the repair, maintenance and modernization of existing buildings give every indication of rising still further in the months ahead.

Pages from an ENGINEER'S NOTEBOOK
MEMO: Purchasing Dept.
SUBJECT: Acme Products
Have just completed survey of refrigeration product field. One name, ACME, stands out as foremost in design and construction dependability. Recommend that we specify ACME for future refrigeration needs.
B.M.C
MEN who know always specify Acme
AMMONIA CONDENSERS
1. Exclusive lock-nut construction available for quick and easy tube replacement. 2. A.S.M.E. construction and certification. 3. Performance-tested under field conditions. 4. Dependable, versatile and economical. 5. Full range of models, types, and sizes.
BLOW-COLD* INDUSTRIAL UNIT COOLERS
1. Hot-dip galvanized finish, assures greater durability. 2. Your choice of vertical or horizontal discharge. 3. Easy accessibility to coils. 4. Separable fan section. 5. Large inspection doors. 6. Air duct front or back for greater convenience. 7. Available for Freon 12 or Ammonia.
*Trade Mark
EVAPORATIVE CONDENSERS
1. For Freon or Ammonia. 2. Using, standard A.S.R.E. ratings, capacities from 10 to 120 tons. 3. Your choice of three different fan locations. 4. Greater durability . . . it's hot-dip galvanized. 5. Available with internally mounted receivers, including piping. 6. Available for indoor or outdoor applications.
ACME'S fine workmanship is your guarantee of maintenance-free, low cost operation and long life. Let ACME Engineers help you solve your unusual heat transfer problems. Write for information or for catalog on equipment in which you are interested.
Address Dept. IR
ACME INDUSTRIES, INC., Jackson, Mich.
AIR CONDITIONING and REFRIGERATION DIVISION
Continuously serving the air conditioning and refrigeration industry since 1919

CATALOGS AND BULLETINS

New Catalog on Industrial Trucks

A NEW 18-page catalog describing two units of the Master Line of industrial trucks, the Jacklift Electric and the Master Jackstacker truck, is now available to industry from Lewis-Shepard. Just off the press, this catalog describes the latest engineering and operating features of the various models which represent some of the most advanced electric-powered trucks in the field. More power, shorter headroom, better controls, more stamina and stability have been engineered into the most compact designs possible. Fully illustrated with photographs and engineering drawings, specifications and maintenance features are explained in full.

The various models of these two units, the catalog points out, represent important advances toward greater savings in plant and warehouse storage space and assure the user easier, safer operation.

New Bulletin on Styrofoam

THE Dow Chemical Company announces a new bulletin on the use of Styrofoam for low-temperature insulation. In addition to providing the properties of Styrofoam, the 24-page illustrated booklet covers methods of installing the material on various surfaces, how to apply adhesives and finishes, and data on several low-temperature applications, including insulated vehicles, ship holds, refrigerated equipment, and many industrial uses. The bulletin is available without cost from the Plastics Department, The Dow Chemical Company, Midland, Michigan.

THE BUYERS DIRECTORY

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ABSORBERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

AIR COMPRESSORS
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Carrier Corp., Syracuse, N. Y.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.

AMMONIA COMPRESSORS
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Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA CONTROL DEVICES
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.

AMMONIA FLOAT VALVES
Acme Industries, Inc., Jackson, Mich.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesvoro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA MANUFACTURERS
Bower Chemical Mfg. Co., Henry Philadelphia, Pa.
du Pont, Polychemicals Dept., Wilmington, Delaware

AMMONIA PURIFIERS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
International Salt Co. Inc., Scranton, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA RECEIVERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA VALVES & FITTINGS
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

ARCHITECTS AND ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

ASPHALT PRODUCTS
American Bitumuls & Asphalt Co. San Francisco, Calif.

AUTOMATIC CONTROL DEVICES
Alco Valve Co., St. Louis, Mo.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Lumenite Electronic Co., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.

BAGS, ICE
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Corp., New York, N. Y.

BAGS, WATERPROOF PAPER
Index Coupon & Supply Co., La Porte, Ind.
Union Bag & Paper Co., New York, N. Y.

BEER COOLERS
Frick Co., Waynesboro, Pa.
Martocello & Co., Jos. A., Philadelphia, Penna.
Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
Frick Co., Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Nickerson & Collins Co., Chicago, Ill.

BRINE CIRCULATORS
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Roots-Connersville Blower Corp., Connersville, Ky.

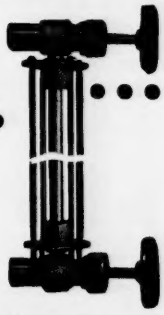
BRINE COOLERS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Reynolds Mfg. Co., Springfield, Mo
Vogt Machine Co., Henry, Louisville, Ky.

SHANK REFRIGERATION PRODUCTS

ALWAYS DEPENDABLE!

SEMI-STEEL SHUT-OFF VALVE

Highest grade non-porous metal—full size ports—clean cut threads. Back seated stem — Shank design base—perfect alignment. Long life packing ring.



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All-Steel Construction. Automatic shut-off of liquid in case of glass breakage. Composition packing rings give long life, no-leak seal.

If your jobber doesn't stock—write

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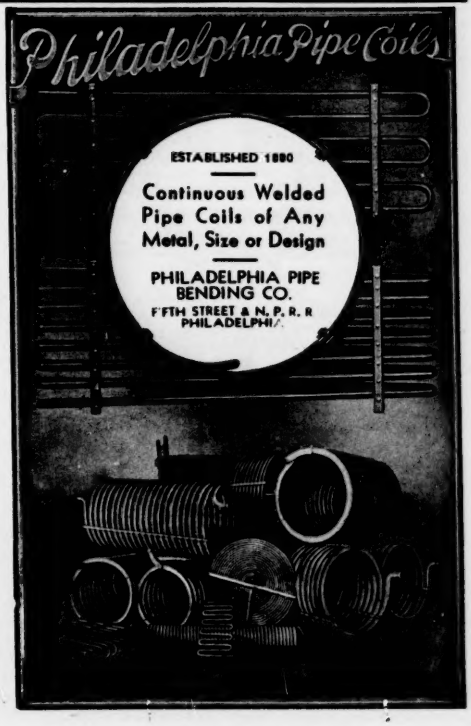
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Continuous Welded Pipe Coils of Any Metal, Size or Design
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PHILADELPHIA

ICE THICKNESS Controlled by These Electronic Fingers

Maintains Automatically by electronic action, correct accumulation of Ice in any Ice Builder Cooling System.

Keeps water at constant temperature by controlling exact amount of ice.

Write for Bulletin 1051.

LUMENITE ICE THICKNESS CONTROL

- NO Thermostats
- NO Moving Parts
- NO Adjustments
- ICE Controlled at Source
- Never Forgets
- Saves Power

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Wolf-Linde
ESTAB. 1880

Ammonia COMPRESSORS

Designed for severe service conditions in the industrial refrigeration field where reliable and continuous compressor operation is required. They are vertical, twin cylinder, single acting, fully enclosed and crank driven. Sizes: 5x5, 6½x6½, 7x6½ and 8½x8½.

Ask for Specifications on size you require.

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THE BUYERS

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BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.

BRINE TREATMENT
International Salt Co. Inc., Scranton, Pa.

CALCIUM CHLORIDE
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.

CAN DUMPS
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CAR ICING EQUIPMENT
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Tri-Pak Machinery Service Inc., Harlingen, Tex.

COILS
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co., Chicago, Ill.
Creamery Package Mfg. Co., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

COLD STORAGE CONSTRUCTION
Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.

COLD STORAGE DOORS
Butcher Boy Refrigerator Door Co., Chicago, Ill.
Jamison Cold Stge. Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Montgomery, Minn.

COMPRESSORS
(See Ice Making and Refrigerating Machinery)

COMPRESSOR VALVE PLATES AND DISCS
Voss, Inc., J. H. H., New York, N.Y.

COMPRESSOR VALVES
Voss, Inc., J. H. H., New York, N.Y.

CONDENSERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Enterprise Equipment Corp., Yonkers, N. Y.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CONSULTING ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

CONTROLLING INSTRUMENTS
Kramer Trenton Co., Trenton, N. J.
Lumenite Electronic Co., Chicago, Ill.
Taylor Instrument Cos., Rochester, N. Y.

CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.

COOLING TOWERS
Frick Co., Waynesboro, Pa.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa.

CORROSION CONTROL
Wright Chemical Corp., Chicago, Ill.

COUPON BOOKS
Index Coupon & Supply Co., La Porte, Ind.
Vivian Mfg. Co., St. Louis, Mo.

COVERINGS (PIPE AND BOILERS)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.

CYLINDERS (GAS & LIQUID)
Byers Co., A. M., Pittsburgh, Pa.

DIP TANKS AND CAN BASKETS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

DRIVES, TRANSMISSIONS
Frick Company, Waynesboro, Pa

ELEVATING & CONVEYING MACHINERY
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lewis-Shepard Products, Inc., Watertown, Mass.
Lilly Co., The, Memphis, Tenn.

ENGINEERS AND ARCHITECTS
(See Architects and Engineers)

EVAPORATIVE CONDENSERS
Niagara Blower Co., New York, N. Y.

EVAPORATORS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N. Y.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FEED-WATER HEATERS
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Vogt Machine Co., Henry, Louisville, Ky.

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FIELD ICE SAWS
Gifford-Wood Co., Hudson, N. Y.

FILTERS, WATER
Frick Co., Waynesboro, Pa.

FIN COILS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.

FITTINGS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

FLOOR PATCHING
Permamix Corp., Chicago, Ill.

FOOD FREEZING EQUIPMENT
Howe Ice Machine Co., Chicago, Ill.

FROZEN FOOD LOCKERS
Knickerbocker Stamping Co., Parkersburg, W. Va.

FUEL OIL PRE-HEATERS
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.

HAND TRUCKS
Ohio Galvanizing & Mfg. Co., Niles, Ohio

HOISTING APPARATUS
Capital Elevator & Mfg. Co., Columbus, Ohio
Reynolds Mfg. Co., Springfield, Mo.

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Niagara Blower Co., New York, N. Y.

HYGROMETERS
Taylor Instrument Cos., Rochester, N. Y.

ICE BAGS
Union Bag & Paper Corp., New York, N. Y.

ICE BLOWERS
Gifford-Wood Co., Hudson, N. Y.

ICE CANS
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

ICE CAN FILLERS
Frick Co., Waynesboro, Pa.
Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

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Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Vivian Mfg. Co., St. Louis, Mo.

ICE CHUTES
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Jamison Cold Storage Door Co., Hagerstown, Md.

ICE CONVEYORS
Capital Elevator & Mfg. Co., Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Refrigeration Engineering Co., Montgomery, Minn.

ICE CREAM PLANTS
Frick Co., Waynesboro, Pa.

ICE CRUSHERS
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Lilly Co., The, Memphis, Tenn.
Tri-Pak Machinery Service Inc., Harlingen, Tex.
Vivian Mfg. Co., St. Louis, Mo.

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Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Union Bag & Paper Co., New York, N. Y.
Vivian Mfg. Co., St. Louis, Mo.

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Vivian Mfg. Co., St. Louis, Mo.

ICE CUBING MACHINES
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Lilly Co., The, Memphis, Tenn.

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Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Union Bag & Paper Corp., New York, N. Y.
Vivian Mfg. Co., St. Louis, Mo.

ICE HARVESTING MACHINERY & TOOLS
Gifford-Wood Co., Hudson, N. Y.

ICE MAKING AND REFRIGERATING MACHINERY
Carrier Corp. Syracuse, N. Y.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Enterprise Equipment Corp., Yonkers, N. Y.
Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

REMPE

Pipe Coils
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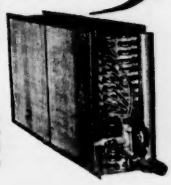
***For* Refrigeration, Air Conditioning, Heating**



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Send your problems to us for engineering assistance.

HEAT TRANSFER EQUIPMENT
REMPE CO.

REMPE COMPANY
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***New* "BIG CHIEF"**

FAST, ECONOMICAL CRUSHER
Saves Time and Labor Costs!

The new Bateman "Big Chief" Crusher is 50 lb. block capacity. Completely galvanized. Direct flywheel drive— no gears. Shaft diameter is 1-11/16". Self aligning ball bearings, 2 hp motor, with 3 groove pulley and V-belt. Castings are heavier and more durable. Will grind 50 lb. blocks with grate closed in 10 seconds, with grate wide open in 6 seconds. New design in hopper so the block of ice is held in a wedge so teeth can get a firm bite, eliminating ice chattering on drum. Holds snow to absolute minimum.

Write today for full information.

Price: $335.00 less motor, F.O.B. Mineral Wells, Tex. 2 hp, 1 phase, mtr. 170.80 2 hp, 3 phase mtr. 101.20.

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Ice Processing Equipment

May we supply paper bags for your Cube and Sized Ice party service?

Also Headquarters for . . .

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Signal cards

Canvas Bags and Tarps

Crushers

Small tools.

Our modern printing plant can also furnish business stationery, office forms, etc. Give us a Trial on these items.

Complete catalog for the asking.

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LaPorte, Indiana

Your Assurance of Best Quality

REFRIGERATION COILS

made by The National

PIPE BENDING COMPANY

All features that you demand are furnished regularly in National Pipe Bending Refrigeration coils—smooth bends, perfect welds, measurements exact.

For long service, specify coils by the National

Pipe Bending Co.

Established 1883

162 River St., New Haven, Conn.

THE BUYERS

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ICE PICKS AND PLANERS
Gifford-Wood Co., Hudson, N. Y.
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Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

ICE PICK SCABBARDS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Vivian Mfg. Co., St. Louis, Mo.

ICE PLANTS
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.

ICE SCALES
Conveyor Co., The, Los Angeles, Calif.
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

ICE TOOLS
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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.

ICE VENDING KITS
Ballard Sales Co., Ft. Worth, Tex.
Refrigeration Engineering Co., Montgomery, Minn.

ICE VENDORS
Frick Company, Waynesboro, Pa.
Jamison Cold Storage Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Montgomery, Minn.
S & S Vending Machine Co., San Jose, Calif.
Vivian Mfg. Co., St. Louis, Mo.

INDICATING INSTRUMENTS
Taylor Instrument Cos., Rochester, N. Y.

INSTANTANEOUS HEATERS
National Pipe Bending Co., New Haven, Conn.

INSULATING MATERIALS
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Pacific Lumber Co., San Francisco, Calif.

INSULATION ADHESIVES
American Bitumuls & Asphalt Co. San Francisco, Calif.

LIFT TRUCKS
Lewis-Shepard Products, Inc., Watertown, Mass.

LOW TEMPERATURE EQUIPMENT
(See Ice Making and Refrigerating Machinery)

MATERIALS HANDLING EQUIPMENT
Ohio Galvanizing & Mfg. Co., Niles, Ohio

OIL AND LUBRICANTS
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OIL SEPARATORS
King-Zeero Co., Chicago, Ill.
Rex Engineering & Sales Co., Oklahoma City, Okla.

OILS, CUTTING
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

OILS, FUEL
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.

PACKINGS
Frick Company, Waynesboro, Pa.
Vivian Mfg. Co., St. Louis, Mo.

PIPE COILS AND BENDS
Acme Industries, Inc., Jackson, Mich.
Chicago Nipple Mfg. Co., Chicago, Ill.
Frick Company, Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PIPE WELDING
Acme Industries, Inc., Jackson, Mich.
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

PIPING
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Frick Company, Waynesboro, Pa.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

PRESSURE BLOWERS
Roots-Connersville Blower Corp., Connersville, Ind.

PRESSURE REGULATORS
Taylor Instrument Cos., Rochester, N. Y.

PUMPING MACHINERY
Aurora Pump Co., Aurora, Ill.
Layne & Bowler, Inc., Memphis, Tenn.
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPING MACHINERY—AIR LIFT
Roots-Connersville Blower Corp., Connersville, Ind.

PUMPS, AMMONIA AND BRINE
Frick Company, Waynesboro, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.

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PURGERS
Armstrong Machine Works, Three Rivers, Mich.
Frick Company, Waynesboro, Pa.
Rex Engineering & Sales Co., Oklahoma City, Okla.

RAW WATER FREEZING SYSTEMS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

REBOILERS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

RECORDING THERMOMETERS
Taylor Instrument Cos., Rochester, N. Y.

REFRIGERATED ICE STATIONS
Refrigeration Engineering Co., Montgomery, Minn.
S & S Vending Machine Co., San Jose, Calif.

REFRIGERATING AND ICE MAKING MACHINERY
(See Ice Making and Refrigerating Machinery)

RUST PREVENTATIVES
Bower Chemical Mfg. Co., Henry Philadelphia, Pa.
Wright Chemical Corp., Chicago, Ill.

SCORING MACHINES
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Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Perfection Ice Scoring Machine Co., Fort Worth, Texas

SECOND HAND MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.

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Frick Company, Waynesboro, Pa.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Vogt Machine Co., Henry, Louisville, Ky.

SHOULDER PADS
Gifford-Wood Co., Hudson, N. Y.
Index Coupon & Supply Co., La Porte, Ind.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

SIZED ICE EQUIPMENT
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

STORAGE HEATERS
National Pipe Bending Co., New Haven, Conn.

TANKS
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

TARPAULINS
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Lilly Co., The, Memphis, Tenn.
Vivian Mfg. Co., St. Louis, Mo.

THERMOMETERS
Taylor Instrument Companies, Rochester, New York

THERMOMETERS, RECORDING
Taylor Instrument Cos., Rochester, N. Y.

TIERING MACHINES
Capital Elevator & Mfg. Co., The, Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.

TRAPS, OIL & STEAM
Armstrong Machine Works, Three Rivers, Mich.
Rex Engineering & Sales Co., Oklahoma City, Okla.

UNIT COOLERS
Acme Industries, Inc., Jackson, Mich.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Rempe Company, Chicago, Ill.

USED MACHINERY
Enterprise Equipment Corp., Yonkers, N. Y.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.

VALVES AND FITTINGS
Alco Valve Co., St. Louis, Mo.
Frick Company, Waynesboro, Pa.
Henry Valve Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., West Englewood, N. J.
Phillips & Co., H. A., Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
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VALVES, COMPRESSOR
Voss, Inc., J. H. H., New York, N.Y.

WATER COOLERS
Acme Industries, Inc., Jackson, Mich.
Niagara Blower Co., New York, N. Y.
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Barada & Page, Inc., Kansas City, Mo.
International Salt Co. Inc., Scranton, Pa.
Wright Chemical Corp., Chicago, Ill.

WELDING
Frick Company, Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

WELL SCREENS
Layne & Bowler, Inc., Memphis, Tenn.

WROUGHT IRON PIPE
Byers Co., A. M., Pittsburgh, Pa.

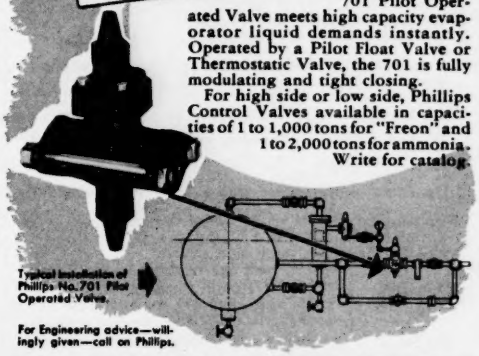
REFRIGERANT SUPPLY MEETS DEMANDS... *Automatically*

with PHILLIPS FLOAT CONTROLS

PILOT OPERATED LIQUID CONTROL VALVES

The Phillips No. 701 Pilot Operated Valve meets high capacity evaporator liquid demands instantly. Operated by a Pilot Float Valve or Thermostatic Valve, the 701 is fully modulating and tight closing.

For high side or low side, Phillips Control Valves available in capacities of 1 to 1,000 tons for "Freon" and 1 to 2,000 tons for ammonia. Write for catalog.



Typical installation of Phillips No. 701 Pilot Operated Valve.

For Engineering advice—willingly given—call on Phillips.

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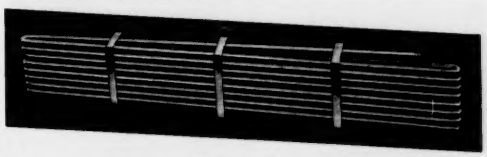
3255 W. CARROLL AVE., CHICAGO 24, ILLINOIS

REPRESENTATIVES: The C & S Equipment Co., 2103 S. San Pedro St., Los Angeles, Cal. • Mason Emanuels Co., 90 Dearborn St., Seattle 4, Wash.



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Perhaps you can bend pipe in your own plant but it's not economical to use your own staff on work of this sort when you can buy coils and pipe fabrications from CHICAGO NIPPLE so reasonably and keep your men busy on more profitable work.

Coils and pipe fabrications from CHICAGO NIPPLE are made to your *exact* specifications and delivered when promised. We've pipe *in stock* for your next order.

Submit drawing or B/P for estimate

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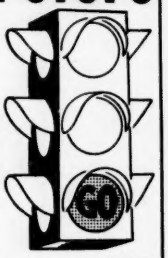
TRAFFIC NEVER STOPS

when you repair your floors with

PERMA*Mix*-C

FOR PATCHING IN TEMPERATURES FROM 5° ABOVE ZERO TO -30° BELOW



3 EASY STEPS TO FOLLOW:

- Clean area to be patched. Apply primer supplied in drum. Prime about 2" outside of patch.
- Fill area with PERMAMIX-C, just as it comes from the package, allowing sufficient material for slight crown.
- Tamp solidly in place and resume traffic immediately.

No mixing, waiting or production delays when you repair your floors the easy, fast PERMAMIX-C way. Comes in handy, durable 50 lb. net weight drums.

ALSO AVAILABLE! Standard PERMAMIX for patching in temperatures from 10° to 100° above zero...using the same 3 easy steps.

PERMAMIX CORPORATION
220 N. LaSalle St. • Chicago I, Illinois

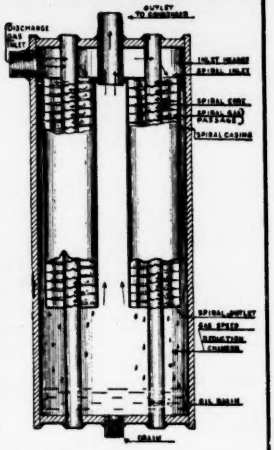
"King Zeero"

OIL SEPARATOR

STOPS OIL FROM ENTERING CONDENSER RECEIVER AND LOW SIDE

Allows operation as was originally intended. Simple in operation — no parts to wear out — no screens, metal wool or any close screens to clog, raise discharge pressures and cut down capacity.

When used in connection with air compressors, water is also separated with the oil.



Built for years of trouble free service. Mechanical details on request.

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CEMCO

Double Gig Ice Hoist
Fast - Sturdy -
Dependable -

Send for details

THE CAPITAL ELEVATOR & MFG. CO.
424 W. Town St.
Columbus 8, Ohio

USED ICE MACHINES & EQUIPMENT

- COMPRESSORS—3x3 to 12x12
- COMPRESSORS—with or without MOTORS
- COMPRESSORS—Diesel or Steam driven
- COMPLETE ICE PLANTS—15 to 50 Tons
- CONDENSERS—TRAVELING CRANES—PIPE — ICE CANS — NEW and USED

See Our Monthly Specials in the Classified Columns

Write or call for complete list of new and reconditioned ice making equipment.

ROBERT P. KEHOE MACHINERY CO., INC.
278 W. Englewood Ave. West Englewood, N. J.
TEaneck 7-3916

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ *Saves Space*
★ *Saves Weight*
★ *SavesCost*

CAN BE USED WITH ANY REFRIGERANT

Write for descriptive folder

DETROIT ICE MACHINE COMPANY
2615 Twelfth St., Detroit 16, Mich.

DIMCO Evaporators in a Frozen Food Storage Room at Great Lakes Terminal Warehouse, Toledo, Ohio. A typical installation facilitating palletizing.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: $4.00 for 50 words or less; 70c for each additional 10 words or fraction thereof; $1 per line for bold face headings; $10.50 per inch for line listings.

POSITIONS AND HELP WANTED

WANTED—Man for combination warehouse work and care of ammonia compressors and equipment in plant in Central Wisconsin. Experience preferred, but will train the right man. Write Box OT-7, c/o Ice and Refrigeration.

POSITION WANTED—Wish to locate work as operating engineer with reliable firm. Middle aged, I retired two years ago after owning and operating my own ice plant for 28 years. I find I cannot remain idle. Will furnish ability and reliability references. Address Box OT-2, c/o ICE AND REFRIGERATION.

ICE PLANTS—for sale

FOR SALE—Ice plant at Edwardsville, Ill. Complete 30 ton plant with adequate cold storage. Any reasonable offer considered. Will sell either the equipment only or as entire plant. Open for inspection. Contact Frank S. Pereboom, Jerseyville, Ill.

FOR SALE—Complete 65 ton ice plant in Illinois. Three ice storages suitable for freezer storage. Two Fairbanks-Morse Diesels 150 h.p. each, 2 Vilter compressors 9½x9½ and 10½x10½. Plant served by two major railroads. Will sell entire plant or machy. and equipt. Address Box SP-6, c/o Ice and Refrigeration.

FOR SALE—Former ice cream plant. 4 large cold storage rooms, 113 tons ref., 5 compressors, complete system. 25,000 sq. ft. brick building well located. Will sell with or without building. $7,000 for all the refrigeration. Long easy terms on building; consider lease. Liquidator Best Ice Cream Co., Inc., 636 Jackson Ave., New Orleans 13, La.

FOR SALE—Called into service, must sell 30-ton ice plant now in operation. New building, high speed compressors, trunk coil, evaporative condensers, Diesel powered low cost plant. Cubing, sizing and scoring machines. Good ice market—big demand. Can add cold storage and freezer; none available in city. Property facing on 3 streets, 7 car railroad siding; plenty of room for expansion. U. S. Ice Co., Inc., 909 Mediterranean, Atlantic City, N. J.

USED EQUIPMENT-wanted & for sale

FOR SALE

Complete 50 ton York low pressure air 4-can group freezing system, 9x9 compressor and motor, 6x6 compressor, vertical shell and tube condensers, room coils. 100 lockers, 2 portable walk-in freezers 28x12x7 and 12x12x7. Will sell any part of above. York Corporation, 1616 Walnut St., Philadelphia 3, Pa.

USED MACHINERY—continued

FOR SALE
USED ICE PLANTS AND REFRIGERATING EQUIPMENT
Complete ice plants—10-50 ton.
Ammonia compressors—all sizes.
Condensers, brine coolers, ice cans.
Valves and fittings.
B & E REFRIGERATING CO.
2 ORANGE ST., NEWARK 2, N. J.
Phone: MItchell 3-7790 Cable address "BERECO"

FOR SALE—ICE CANS

100—New 11x22x47" high pressure ice cans, $8.95 each F.O.B., Dyersburg, Tenn. 200—used, 11½x22½x44" low pressure cans, $3.00 each, F.O.B. Tupelo, Mississippi. Contact Wilson Fly, Box 5506, Memphis, Tenn.

FOR SALE
YORK—LATE MODEL ICE MACHINES AND EQUIPMENT 50 TON ELECTRIC

1—9x9 enclosed type compressor—V belt drive, automatic lubrication.
1—60 h.p. Century motor—2200 volt for 9x9.
1—7½x7½ enclosed type compressor—V belt drive, automatic lubrication.
1—40 h.p. Century motor—2200 volt for 7½x7½.
2—Westinghouse magnetic starters.
2—Vertical direct connected agitators—3 h.p.
1—Hoffman blower, 1—Wilbrahn-Green Blower.
2—60 KVA condensers or capacitors.
1—York ammonia condensers, shell & tube.
2—Can Euclid hoist—1 ton.
1—Meir crane mover.
1—Model JBAZ International water softener complete steel tank—top operated with mixer—one 24" and one 30" pressure filter.
1—Cook 8"—5 stage turbine pump, 5 h.p.
450—400-lb. ice cans, like new, (Ohio), 11½x22½x57, in brine.
220—White oak dual covers for ice tank—400 lb.
1—can filling tank, 2 accumulators, brass drop tubes and brackets, 2 can dump.
1—Miller scoring machine for 400-lb. blocks.
1—Perfection scoring machine for 400-lb. blocks.
1—Gifford wood tiering machine—8 tier.
Many other items not listed.
WHITE FROST ICE CO., INC.
5th & Main Sts. Anderson, Ind.
Phone 7702

FOR SALE—Brand new 7x7 ft. Worthington ammonia compressor complete with flywheel and "V" drive for use with 1750 r.p.m. motor. Subject to prior sale F.O.B. Emporia, Virginia. Refrigeration Engineering Corporation, 150 Nassau St., New York 38, N.Y.

FOR SALE
CARRIER REFRIGERATING EQUIPMENT
Used Centrifugal refrigerating machine, Model 17-M, size 42, applicable to all refrigeration and air conditioning requirements, maximum 240 tons, direct connected to Murray low pressure steam turbine. Can be used for various capacities and temperatures. Complete unit, excellent condition. Can be purchased at a saving of fifty per cent of new cost. Immediate delivery. Denny & Clark, 1923 W. North Ave., Chicago 22, Ill.

WANTED—One cold storage door minimum 42" wide and 6' high inside with hardware. Advise condition and thickness. Wilson Fly, P.O. Box 5506, Memphis, Tenn.

FOR SALE
KEHOE MONTHLY SPECIALS
2—7¼x7¼ high-speed Bakers.
2—8x8 high-speed Carbondale Compressors.
1—9x9 high-speed Worthington Compressor.
3—sets of 10x10 duplex York or Frick, with 225 h.p. syn. motor 300 r.p.m.
ROBERT P. KEHOE MACHINERY CO., INC.
278 W. Englewood Ave. West Englewood, N. J.
Phone: TEaneck 7-3916

FOR SALE—Small sizes ammonia compressors, self-contained units 6x6 and 9x9 with motors, 7½x7½ with synchronous motor. Ice tanks, coils, brine coolers, York trunk coil, agitators, cans, blowers. We desire good equipment for export. Parke Pettegrew & Son Co., 370 West Broad St., Columbus 8, Ohio.

FOR SALE
2—Bruce 165 h.p. West. 125 KVA units, ea. $3,350.00
Our current catalog sheets on request.
Please let us know what you have for sale.
A A A STEEL, MACHINERY & SUPPLY CO.
Box 6246 Dallas, Texas

COMPLETE ICE MAKING PLANTS
50 ton Frick, 27 can pull, evapor. condensers.
60 ton DeLaVergne, 14 can pull.
35 ton York, Diesel drive, 6 can pull.
AMMONIA COMPRESSORS
1—12½x12½ York, 175 h.p. motor.
2—10x10 Yorks, 100 h.p. motors.
2—8½x8½ Vilters, 75 h.p. motors.
1—8x8 York, 60 h.p. motor.
1—7½x7½ York, high speed.
Perfection "Special" ice scoring machine, 20,000 ft. 1¾" ammonia pipe, Arctic Pownall ice lifting hooks, ice cans, blowers, etc.
JOHN F. CARSON
2829 N. Broad St. Philadelphia 32, Pa.
BAldwin 9-8549

FOR SALE—3x3, 4x4, 5x5 self contained Yorks. 3x3, 4x4, 5x5, 6x6, 8x8, 9x9 splash lubrication Yorks. ½", ¾" and 1¼" York valves, 30% off. Three Acme Freon suspended type blower units, 2 ton capacity. Write E. Niebling, 1546 St. Clair Ave., Mount Healthy, Cincinnati 31, Ohio.

LIQUIDATING—complete 100 ton ice plant; sell each piece or entire unit. Two Howe 11½x11½ compressors with 135 h.p. synchronous motors, York D8—7½x7½, 1000 350 lb. ice cans, Air compressors, ice cuber, Uline scoring, ice crusher, etc. Gordon Equipment Co., Liquidators, 6530 W. Jefferson, Detroit 17, Mich.

FOR SALE—USED ICE PLANTS & REFRIGERATING EQUIPMENT
Complete Ice Plants 15-75 Ton
Ammonia Compressors, 3" x 3" to 12½" x 14½"
Condensers, Cranes, Blowers, coring Machines, Ice Canes—Various sizes.
Write or wire us on any equipment you may need.
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Cable Add.: ENEQCO Ph.: Yonkers 8-8118-9

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Ice Making and Refrigeration - Industrial Power Plants
Reports, Appraisals and Management

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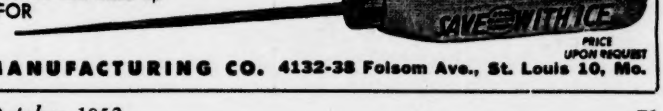
ICE TOOLS AND SUPPLIES

WE CONTINUE YEAR AFTER YEAR
to make the kind of Ice Picks that will give YOUR customers satisfaction and build up GOOD WILL FOR YOU.



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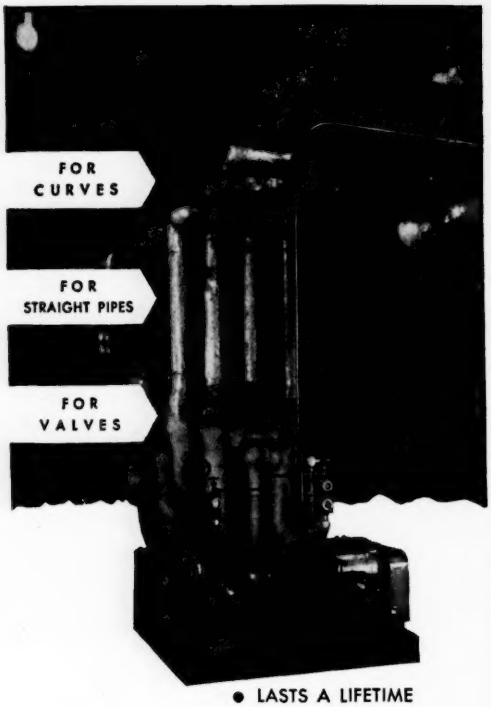
VIVIAN MANUFACTURING CO. 4132-38 Folsom Ave., St. Louis 10, Mo.



- LASTS A LIFETIME
- EASILY INSTALLED
- APPLIES WITHOUT WASTE

for Maximum Efficiency

SPECIFY ALL-HAIR

OZITE

INSULATING FELT

OZITE All-Hair Felt has been the best insulation for the refrigeration industry for over half a century. Here's why —

. . . low conductivity provides efficient heat barrier . . . allows close temperature control . . . permits maximum capacity of refrigeration units . . . reduces power consumption . . . does not rot or pack down — resists fire.

For all of the facts about time-proven OZITE send for 4-page Bulletin No. 300.

AMERICAN HAIR & FELT COMPANY
Dept. L-28, Merchandise Mart
Chicago 54, Illinois

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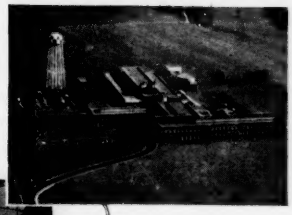
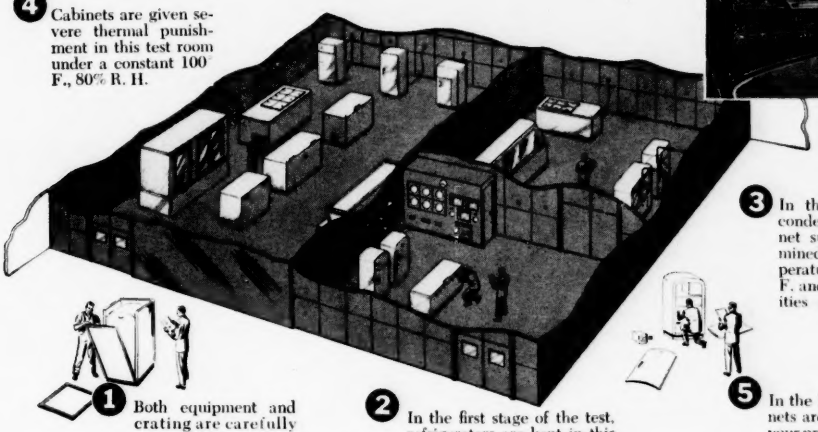
PROVING GROUND

for your refrigerated equipment

in Armstrong's New Research and Development Center





4 Cabinets are given severe thermal punishment in this test room under a constant 100° F., 80% R. H.

1 Both equipment and crating are carefully examined for any damage on arrival. Condition of the equipment must be nearly perfect to assure the most accurate test results.

2 In the first stage of the test, refrigerators are kept in this room at a constant 85° F., 50% R. H. Here, over-all B.T.U. loss and power consumption data are checked.

3 In the second stage, condensation on cabinet surfaces is determined at varying temperatures of 85° to 120° F. and relative humidities of 50% to 92%.

5 In the last stage, cabinets are dismantled in your presence. Defects in insulation and construction are noted. You get a confidential report on the performance of your cabinet.

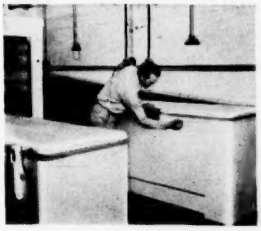
Take advantage of Armstrong's *Life Test* to check performance and design of your units

Now Armstrong offers you a completely new and expanded Life Test Service. Here you can get a preview of how your new models will perform after years of operation, or you can take advantage of our modern facilities to search out weaknesses in your current units. We put your equipment through a series of severe tests—all designed to reveal possible flaws in insulation as well as structural and mechanical defects.

There's no charge for these tests. They're all part of Armstrong's continuing services to designers and manufacturers of refrigerated equipment. Tests are conducted free, provided one of the models you submit uses any of Armstrong's efficient equipment insulations:—LK® Corkboard, Fiberglas*, or Temlok®.

Your near-by Armstrong representative will be glad to help you arrange for testing your equipment. Contact him or write direct to Armstrong Cork Company, 4510 Queen Street, Lancaster, Pennsylvania.

* OCFCorp.



During the second stage, this laboratory technician is marking the sweat pattern of a home freezer under test. Excessive condensation on the cabinet's exterior surface indicates poor thermal design.

To duplicate conditions of home use, home freezers are opened and closed 5 times every day during the 10-week Life Test period. Domestic refrigerators are opened and closed 25 times each day.

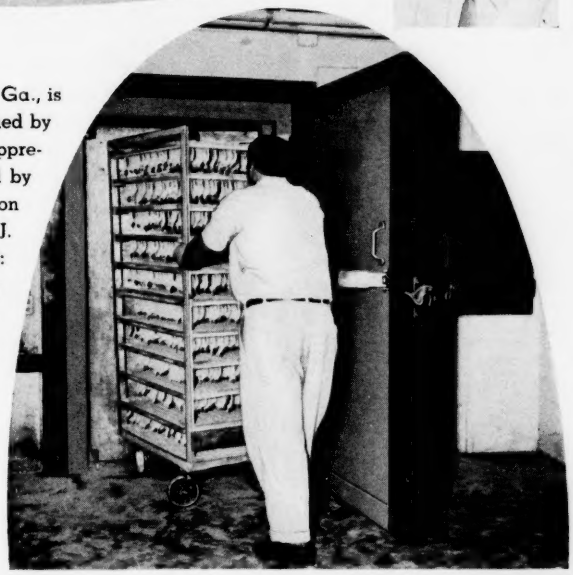
ARMSTRONG'S EQUIPMENT INSULATION

LK CORKBOARD • FIBERGLAS* • TEMLOK

"JAMISON doors were recommended by our engineers. They have proved worthy of the recommendation by their efficiency."

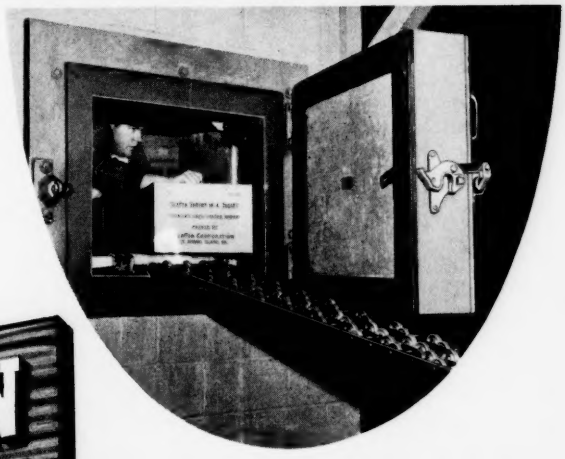
J. ROY DUGGAN, General Manager, SeaPak Corp.

The SeaPak Corporation of St. Simon's Island, Ga., is famous for its packaged shrimp—a fame earned by its advanced processing methods and a keen appreciation that freshness can only be maintained by efficient refrigeration. When asked why Jamison Cold Storage Doors were chosen for his plant, J. Roy Duggan, General Manager of SeaPak, said: *"They were recommended by our engineers and have proved worthy of the recommendation by their efficiency."* For full information on Jamison doors request Catalog, Sec. 1, Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.



SUPER FREEZER DOOR provides a tight seal for this 60° below flash freezing room. Vestibule Door helps save refrigeration during movement of material.

REACH-IN SUPER FREEZER DOOR SPEEDS HANDLING by use of conveyors. Small door size plus self-closing inside batten doors keep refrigeration losses to a minimum when storing or removing cartons.



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The Leader For Over 50 Years